

Appendix

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Floodplains

MEMORANDUM

TO: Brad Rolf
FROM: Linda Mark, RG, CPG and Ken Vigil, PE
DATE: May 9, 2013

SUBJECT: HEC-RAS Existing & Proposed Conditions Model Technical Memorandum

INTRODUCTION

Kodiak Island Borough (KIB) does not participate in the National Flood Insurance Program (NFIP) and so does not regulate construction activities in floodplains. The State Coastal Management Plan (CMP) provides general guidelines for managing natural hazards including flooding but does not provide a strict definition of a floodplain for enforcement. Alaska Administrative Order 175 requires State agencies to use pertinent portions of the NFIP regulations as a guide for construction activities. At the Federal level Executive Order 11988, “requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.” This order requires the agencies to determine if the proposed action is in the 100-year floodplain.

FEMA floodplain mapping is not available for the Kodiak Airport area. Vigil-Agrimis, Inc. (VAI) modeled existing hydraulic conditions for the Buskin River for the 2-, 10-, and 100-year floods under both mean lower low water (MLLW) and mean higher high water (MHHW) tidal scenarios. VAI produced 10- and 100-year recurrence interval floodplain boundaries, based on model output, for use in the project base map. The existing conditions model also provided an understanding of the relationship between hydrologic processes and geomorphic conditions in the Buskin River in the vicinity of the Kodiak Airport. The floodplain boundaries guided the development of Runway Safety Area (RSA) improvements that, to the extent practicable, avoid or minimize impacts to the regulated floodplains.

This technical memorandum updates the previous *DRAFT HEC-RAS Existing Conditions Model Technical Memorandum* (VAI, 2008) by modeling proposed conditions for the Runway 18/36 Alternatives and comparing and contrasting existing and proposed conditions.

HYDROLOGY

Kodiak Island has a maritime climate (Hartman and Johnson, 1984). Weather is typically cloudy and cool with small temperature variations; strong winds; heavy precipitation; and high humidity, fog, and cloud cover. Precipitation across Kodiak Island varies from approximately 30 inches per year on the central northwest side of the island in the rain shadow of the Aleutian Range to 120 inches per year in the central, mountainous part of the island and on the central far eastern coastal areas. Many microclimates exist on the island due to the mountainous terrain.

The average annual temperature is 40.5°F at the Kodiak Airport. Buskin River hydrology is influenced by the island's climate and precipitation. Air temperatures are typically between 20° and 40°F from November to March, and between 30° and 60°F from April to October (NOAA, 2006). Between 1973 and 2004 the highest recorded temperature at the airport was 82°F, and the lowest recorded temperature was -16°F (ACRC, 2008). At the Kodiak Airport, average annual precipitation is 75.4 inches, with January being the wettest month and July being the driest month (NOAA, 2006). Snow is typically heavy and wet and averages 72 inches per year (ACRC, 2008).

The Buskin River is fed by several unnamed tributaries originating from Barometer, Erskine, and Pyramid Mountains. A geographical key feature of this approximately 26 square mile watershed is Buskin Lake. Buskin Lake is a feature that formed during glacial retreat in the region and is located at the center of the Buskin River Valley. The Buskin River flows about four miles southeast across the valley from the lake to its outlet into Chiniak Bay at St. Paul Harbor. Stream systems with storage features, such as extensive wetlands, or a lake in the case of the Buskin River, tend to not have as wide a range of flows between peak events and low flow events.

Peak events are important to understand when developing public infrastructure to avoid or reduce impacts to floodplain function and the damage that can occur to natural resources or human facilities during flood events. The magnitude of flood events is typically described by the event recurrence interval. A recurrence interval is the time between events equal or greater than a given magnitude as determined statistically. The recurrence interval familiar to most people is the 100-year flood, a flood that will statistically occur once in 100 years or has a 1-percent chance of occurring in any given year.

The investigators used regression equations for predicting peak discharge to determine flows for the Buskin River in this study (Table 1). These regression equations (developed by the USGS) are based on flow information and watershed characteristics from 93 gages throughout southern and southeast Alaska (Curran et al., 2003).

Table 1. Buskin River Discharges Predicted Using Regression Equation

Stream	Contributing Drainage (mi ²)	Discharge (cfs)			
Recurrence Interval		2-year	10-year	50-year	100-year
Buskin River	25.7	1,700	2,870	3,990	4,480

Tides

The Buskin River empties into St. Paul Harbor adjacent to the Kodiak Airport. Table 2 summarizes tidal elevations for this area. The water surface elevations in the Buskin River are influenced by the tidal elevations. To account for this influence in modeling the Buskin River, both low tide (mean lower low water, or MLLW) and high tide (mean higher high water, or MHHW) boundary conditions were used at the downstream end of the hydraulic model, and the model was run for all flows (2-, 10-, and 100-year) under the two different tidal conditions.

Table 2. Tide Data for Kodiak Island, Women's Bay, Station 9457292, Epoch 1983-2001

Tide	Elevation (feet, NAVD88)
Extreme High Water (EHW) (December 31, 1986)	14.06
Mean Higher High Water (MHHW)	9.53
Mean High Water (MHW)	8.63
Mean Tide Level (MTL)	5.25
Mean Sea Level (MSL)	5.25
Mean Low Water (MLW)	1.87
Mean Lower Low Water (MLLW)	0.76
Extreme Low Water (ELW) (January 12, 2005)	-2.43

Source: DOWL Engineers, 2008.

MODEL BACKGROUND & METHODOLOGY

Vigil-Agrimis staff used the Hydrologic Engineering Center – River Analysis System (HEC-RAS, version 3.1.3) hydraulic software to create planning-level existing and proposed conditions models of the Buskin River. HEC-RAS version 3.1.3 (U.S. Army Corps of Engineers, 2005) is a one-dimensional (1-D) hydraulic model developed by the U.S. Army Corps of Engineers and is one of the standard 1-D hydraulic models used in the United States. The HEC-RAS model is based on site topographic information including a combination of channel cross-sections surveyed by VAI staff during September 2007 as well as survey data collected by DOWL Engineers' surveyors during autumn 2007.

EXISTING CONDITIONS MODEL RESULTS

The Existing Conditions model was run for the 2-, 10-, and 100-year flows for both the MLLW and MHHW boundary conditions. Longitudinal profiles, existing conditions cross-sections, tabular model output for both MLLW and MHHW tidal conditions, and 10- and 100-year floodplain maps which also show the cross-section locations are located in the appendices. The analysis emphasizes existing conditions results in the Buskin River downstream of the constriction at the former Bridge #1 location as well as in the barrier bar area near the mouth of the Buskin River. These locations are emphasized in this memo because they are closest to the proposed RSA improvements and would be more likely to be affected by any proposed RSA improvements on Runway 18/36.

100- and 10-year Floodplains

The 100-year and 10-year floodplains were mapped for the high tide (MHHW) boundary condition (Figure 1). The 100-year floodplain boundary is used to assess whether or not proposed modifications to the RSA extend into either of these regulated floodplains.

The 100-year floodplain encompasses the Buskin River riparian corridor and the area downstream of the constriction at the former Bridge #1 location (river station (RS) 4496), although under high tide conditions the area downstream of the constriction is influenced by both tidal and fluvial processes. With the exception of the northern tip of the barrier bar at the mouth of the Buskin River, the crest of the barrier bar is not inundated during the 100-year flow (see cross-section plots in Appendix C). With the exception of the area downstream of the constriction which is broad and flat, the 100-year floodplain ranges from about 60 feet wide at RS 8358 and RS 8704 to 470 feet wide at RS 5234 and is confined within the

relatively narrow valley bottom upstream of the constriction (Figure 1). Downstream of the constriction, the 100-year floodplain is up to about 1,020 feet wide at RS 3755. The existing Airport infrastructure is outside of the 100-year floodplain.

The 10-year floodplain has a similar, albeit narrower, footprint (Figure 1). Excluding the area downstream of the constriction, the 10-year floodplain ranges from about 50 feet wide at RS 8704 to about 400 feet wide at RS 5234. Within the area downstream of the constriction, the 10-year floodplain is up to about 1,020 feet wide at RS 3755. Because the area downstream of the constriction is backwatered during high tide, the 100- and 10-year floodplains at high tide are very similar.

Low Tide (MLLW) Boundary Condition

Under low tide conditions, the river flows freely and is not backwatered by the ocean. The free-flowing nature of the river is visible in the longitudinal profiles (Appendix B), which show a decreasing water surface elevation, including the reach downstream of the floodplain constriction at the former Bridge #1 location in the model cross-section plots (Appendix C). Below the constriction (below RS 4496), water velocities range from 0.7 to 10.6 feet per second for the modeled flows (see tabular model output in Appendix D). Flow conditions in the vicinity of proposed alternative are shown in Table 3.

Table 3. Existing Conditions with MLLW Boundary Condition

River Station	Flow Condition	Water Surface Elevation (ft)	Velocity (ft/s)	Channel Shear Stress (lb/sq ft)	Top Width (ft)	Channel Froude #
4496	2-year	8.3	5.4	0.8	72	0.45
4496	10-year	9.3	7.3	1.4	74	0.56
4496	100-year	10.3	9.5	2.3	77	0.68
4415	2-year	8.2	3.0	0.3	247	0.35
4415	10-year	9.4	3.3	0.3	314	0.32
4415	100-year	10.8	3.7	0.3	524	0.30
4188	2-year	7.8	3.3	0.2	299	0.45
4188	10-year	9.2	2.7	0.1	415	0.30
4188	100-year	10.7	2.7	0.1	684	0.24
4050	2-year	7.7	2.8	0.1	411	0.40
4050	10-year	9.2	2.3	0.1	524	0.24
4050	100-year	10.6	2.2	0.1	728	0.19
3923	2-year	7.7	1.4	0.0	471	0.15
3923	10-year	9.2	1.4	0.0	644	0.14
3923	100-year	10.6	1.5	0.0	804	0.12
3755	2-year	7.7	0.7	0.0	812	0.07
3755	10-year	9.2	0.8	0.0	1005	0.07
3755	100-year	10.6	0.9	0.0	1023	0.07

Upstream of the constriction (upstream of RS 4496), velocities range from 1.4 to 11.3 feet per second for the modeled flows. The barrier bar near the mouth of the Buskin River is not inundated.

High Tide (MHHW) Boundary Condition

Under high tide conditions, the tide causes a backwater effect for the 2- and 10-year flows. This backwater effect is visible in the longitudinal profiles (Appendix B) and cross-section plots (Appendix C) which show a very gentle water surface with similar water surface elevations for flows downstream of the constriction (downstream of RS 4496). This backwater condition generally causes higher water surface elevations, slower water velocities, and lesser shear stresses than those under low tide conditions downstream of the constriction. Downstream of the constriction, velocities range from 0.4 to 6.5 feet per second for the modeled flows (see tabular model output in Appendix D). For the 100-year flow in the lower reach, the water surface elevations appear to be controlled more by the narrow river mouth and reduced cross-sectional area downstream of the broad lower reach than by the tides. The low tide and high tide boundary condition 100-year water surface elevations, velocities, and shear stresses are very similar. Flow conditions in the vicinity of proposed fill are shown in Table 4. Upstream of the constriction (upstream of RS 4496), velocities range from 1.3 to 11.3 feet per second for the modeled flows.

Table 4. Existing Conditions with MHHW Boundary Condition

River Station	Flow Condition	Water Surface Elevation (ft)	Velocity (ft/s)	Channel Shear Stress (lb/sq ft)	Top Width (ft)	Channel Froude #
4496	2-year	9.7	4.0	0.4	75	0.30
4496	10-year	10.0	6.5	1.1	76	0.48
4496	100-year	10.3	9.6	2.3	77	0.68
4415	2-year	9.8	1.8	0.1	324	0.17
4415	10-year	10.1	2.8	0.2	350	0.24
4415	100-year	10.7	3.7	0.3	517	0.31
4188	2-year	9.7	1.4	0.0	437	0.14
4188	10-year	10.0	2.1	0.1	499	0.20
4188	100-year	10.6	2.7	0.1	684	0.24
4050	2-year	9.7	1.1	0.0	614	0.11
4050	10-year	10.0	1.7	0.1	664	0.16
4050	100-year	10.6	2.2	0.1	723	0.20
3923	2-year	9.7	0.7	0.0	751	0.07
3923	10-year	10.0	1.1	0.0	761	0.10
3923	100-year	10.6	1.6	0.0	793	0.13
3755	2-year	9.7	0.4	0.0	1016	0.04
3755	10-year	10.0	0.6	0.0	1018	0.05
3755	100-year	10.6	0.9	0.0	1023	0.07

PROPOSED CONDITIONS MODEL RESULTS

The Runway 18/36 alternatives that extend runway end 36 would place fill in the floodplain and have identical impacts to the Buskin River and its floodplain. The proposed conditions model for this alternative was run for the 2-, 10-, and 100-year flows for both the MLLW and MHHW boundary conditions. Appendices contain cross-section data showing the changes at the fill location (RS 3755) (Appendix C) and tabular model output for both MLLW and MHHW tidal conditions (Appendix E). Figure 2 shows the approximate location of the proposed floodplain fill at RS 3755. The analysis emphasizes results in the Buskin River downstream of the constriction (downstream of RS 4496) and barrier bar area since this location is closer to the proposed RSA improvements on Runway 18/36.

For the modeled alternative, 2,010 cubic yards of fill would be placed in the floodplain (defined as the area below elevation 10.6 feet at RS 3755) to extend the RSA, which would reduce flood storage by that volume. This 4:1 side slope fill prism would extend approximately 108 feet into the existing Buskin River floodplain along RS 3755 (Figure 2). Based on model results, this fill would cause an approximately 80-foot reduction in the width of the 10-year and 100-year floodplains at the fill location (RS 3755) (Figure 2). Under proposed conditions, the 100-year floodplain width at RS 3755 would be reduced 80 feet to approximately 940 feet under both MLLW and MHHW conditions (Tables 5 and 6; Figure 2). Under proposed conditions, the 10-year floodplain width at RS 3755 would be reduced 80 feet to 925 and 939 feet under MLLW and MHHW conditions, respectively (Tables 5 and 6; Figure 2). Changes in floodplain widths at other cross-sections are negligible. The longitudinal profile does not change for proposed conditions because water surface elevations do not change.

The proposed fill would not have an effect on the river's ability to pass water at high flows. Modeling does not show higher water surface elevations at or upstream of the fill for the 2-, 10-, or 100-year events, despite the reduction in floodplain width at RS 3755 which constitutes an 8% reduction in floodplain width for the 100-year event (Tables 3, 4, 5, and 6). In addition, this alternative would not result in a change to channel shear stresses (erosive forces). Average channel velocity would increase a negligible 0.1 foot/second or less. Like existing conditions, with the exception of the tip of the barrier bar at the mouth of the Buskin River, the top of the barrier bar is not inundated during the 100-year flow (see cross-section plots in Appendix C). The floodplain width upstream of the constriction is essentially unchanged by the proposed alternative.

The design of the fill was changed subsequent to the modeling to reduce the fill prism side slope from 4:1 to 2:1. This steeper side slope results in less fill (1,960 cubic yards) being placed in the floodplain as well as a reduction in the width of the fill (96 feet). Since the more impactful modeled alternative did not result in a notable effect on floodplain function or hydraulic conditions, additional modeling was not performed to evaluate the 2:1 side slope design.

CONCLUSIONS

High tide conditions, modeled using mean higher high tide for the downstream boundary condition, produce a backwater effect within the Buskin River downstream of the constriction which is apparent due to the higher water surface elevations and lower velocities for the 2-year and 10-year flows. Low tide conditions, modeled using mean lower low tide as the downstream boundary condition, allow the river to flow freely to the ocean. For the 2- and 10-year flows, water velocities and shear stresses in the area

downstream of the constriction are generally slightly higher under low tide conditions than under high tide conditions, but water surface elevations are lower. Water surface elevations, velocities, and shear stresses are similar under low tide and high tide conditions for the 100-year flow. For the 100-year flow in the lower reach, the water surface elevations appear to be controlled more by the narrow river mouth and reduced cross-sectional area downstream of the broad lower reach than by the tides.

Table 5. Proposed Conditions Model Results with MLLW Boundary Condition

River Station	Flow Condition	Water Surface Elevation (ft)	Velocity (ft/s)	Channel Shear Stress (lb/sq ft)	Top Width (ft)	Channel Froude #
4496	2-year	8.3	5.4	0.8	72	0.45
4496	10-year	9.3	7.3	1.4	74	0.56
4496	100-year	10.3	9.5	2.3	77	0.68
4415	2-year	8.2	3.0	0.3	247	0.35
4415	10-year	9.4	3.3	0.3	314	0.32
4415	100-year	10.8	3.7	0.3	524	0.30
4188	2-year	7.8	3.3	0.2	301	0.44
4188	10-year	9.3	2.7	0.1	415	0.30
4188	100-year	10.7	2.7	0.1	685	0.24
4050	2-year	7.7	2.8	0.1	411	0.40
4050	10-year	9.2	2.3	0.1	525	0.24
4050	100-year	10.6	2.2	0.1	728	0.19
3923	2-year	7.7	1.4	0.0	471	0.15
3923	10-year	9.2	1.4	0.0	646	0.14
3923	100-year	10.6	1.5	0.0	806	0.12
3755	2-year	7.7	0.8	0.0	737	0.08
3755	10-year	9.2	0.9	0.0	925	0.08
3755	100-year	10.6	1.0	0.0	944	0.08

Based on proposed conditions modeling and the knowledge that the revised 2:1 side slope fill design would have less of a fill impact to the Buskin River floodplain than the modeled 4:1 side slope fill design, we conclude that:

- The proposed fill would not have an effect on the river's ability to pass water at high flows.
- The impact would be limited to a less than 80-foot reduction in floodplain width at RS 3755 and a 1,960 cubic yard reduction in flood storage due to fill being placed in the floodplain at RS 3755 (Figure 2).
- Water surface elevations would not increase at or upstream of the fill for the 2-, 10-, or 100-year events.
- This alternative would not result in a change to channel shear stresses (erosive forces).
- Average channel velocity would increase a negligible 0.1 foot/second or less.
- Like existing conditions, with the exception of the tip of the barrier bar at the mouth of the Buskin River, the top of the barrier bar would not be inundated during the 100-year flow.
- The floodplain width upstream of the constriction is essentially unchanged by the proposed alternative.
- Overall impacts to the Buskin River floodplain would be minor but permanent.

Table 6. Proposed Conditions Model Results with MHHW Boundary Condition

River Station	Flow Condition	Water Surface Elevation (ft)	Velocity (ft/s)	Channel Shear Stress (lb/sq ft)	Top Width (ft)	Channel Froude #
4496	2-year	9.7	4.0	0.4	75	0.30
4496	10-year	10.0	6.5	1.1	76	0.48
4496	100-year	10.3	9.6	2.3	77	0.68
4415	2-year	9.8	1.8	0.1	324	0.17
4415	10-year	10.1	2.8	0.2	350	0.24
4415	100-year	10.7	3.7	0.3	518	0.31
4188	2-year	9.7	1.4	0.0	437	0.14
4188	10-year	10.0	2.1	0.1	500	0.20
4188	100-year	10.6	2.7	0.1	684	0.24
4050	2-year	9.7	1.1	0.0	615	0.11
4050	10-year	10.0	1.7	0.1	665	0.16
4050	100-year	10.6	2.2	0.1	723	0.20
3923	2-year	9.7	0.7	0.0	751	0.07
3923	10-year	10.0	1.1	0.0	761	0.10
3923	100-year	10.6	1.5	0.0	795	0.13
3755	2-year	9.7	0.5	0.0	936	0.04
3755	10-year	10.0	0.7	0.0	939	0.06
3755	100-year	10.6	1.0	0.0	943	0.08

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APPENDIX A

Figures



FIGURE 1: EXISTING 10- AND 100-YEAR FLOODPLAIN FOR MHHW WITH CROSS-SECTION LOCATIONS

0 125 250 500 1000
SCALE 1"=500'



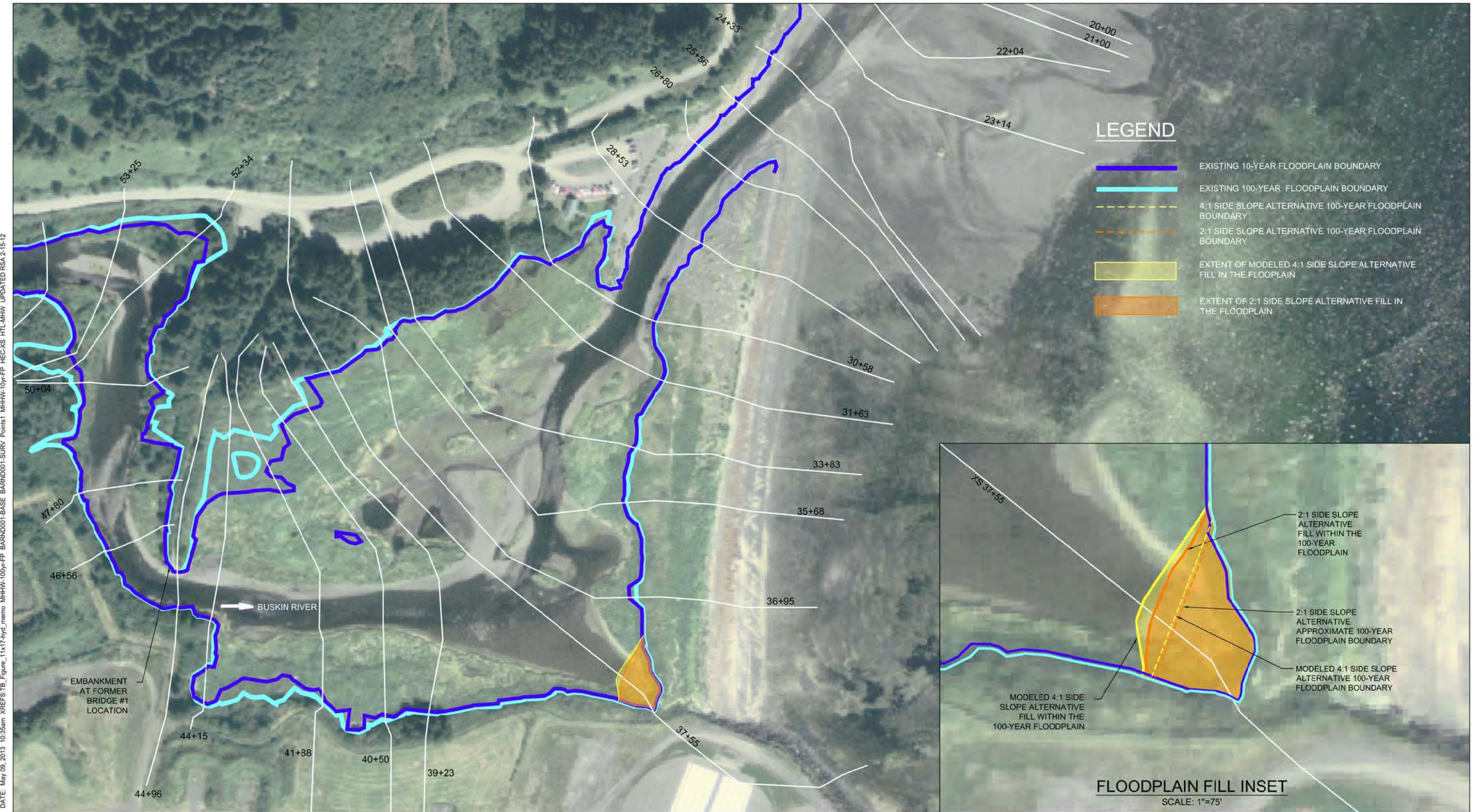
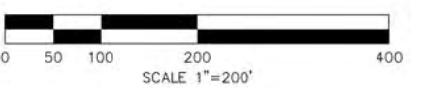


FIGURE 2: EXISTING AND PROPOSED 10- AND 100-YEAR FLOODPLAIN FOR MHHW WITH CROSS-SECTION LOCATIONS AND FLOODPLAIN FILL ALTERNATIVES

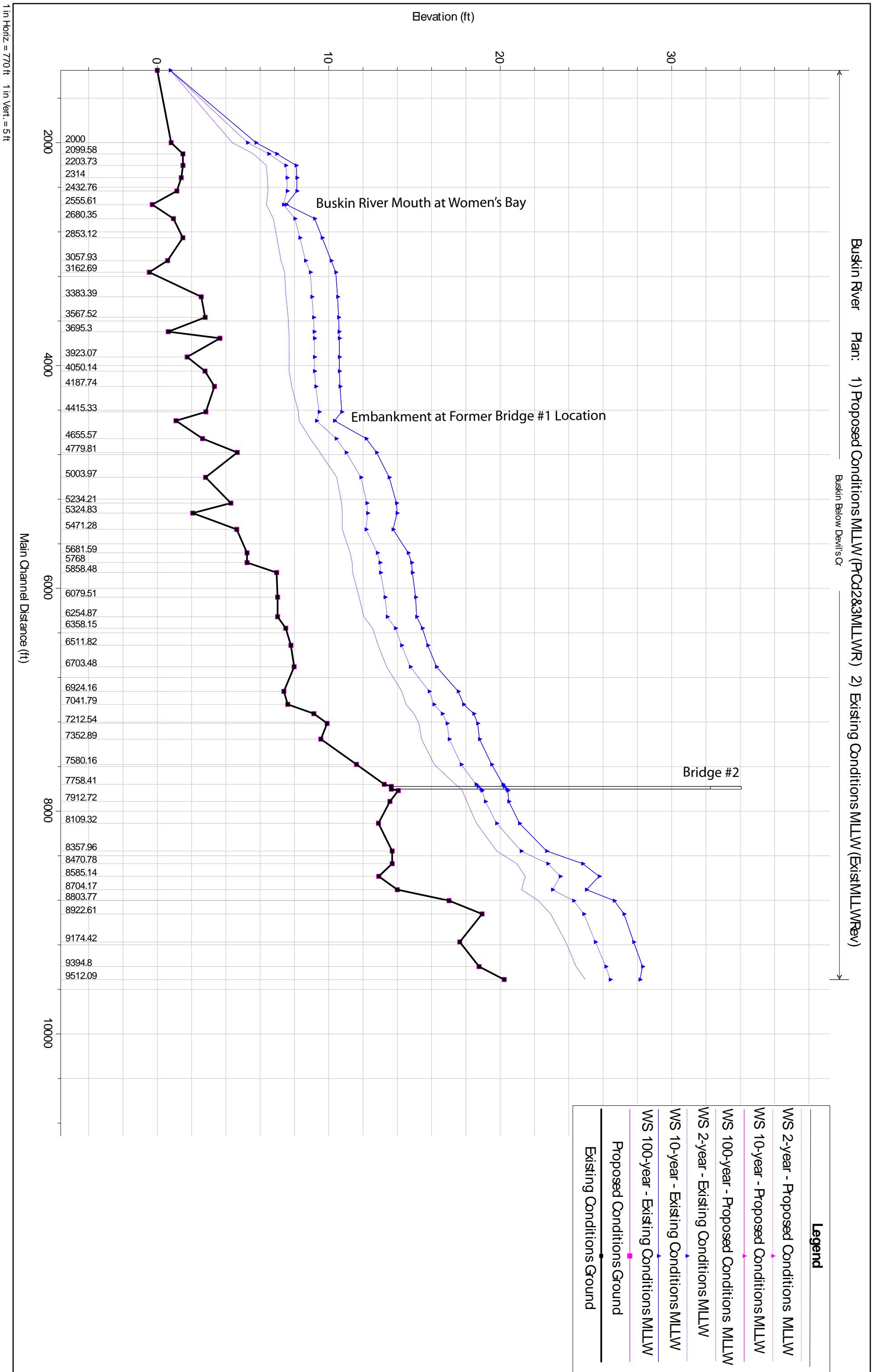


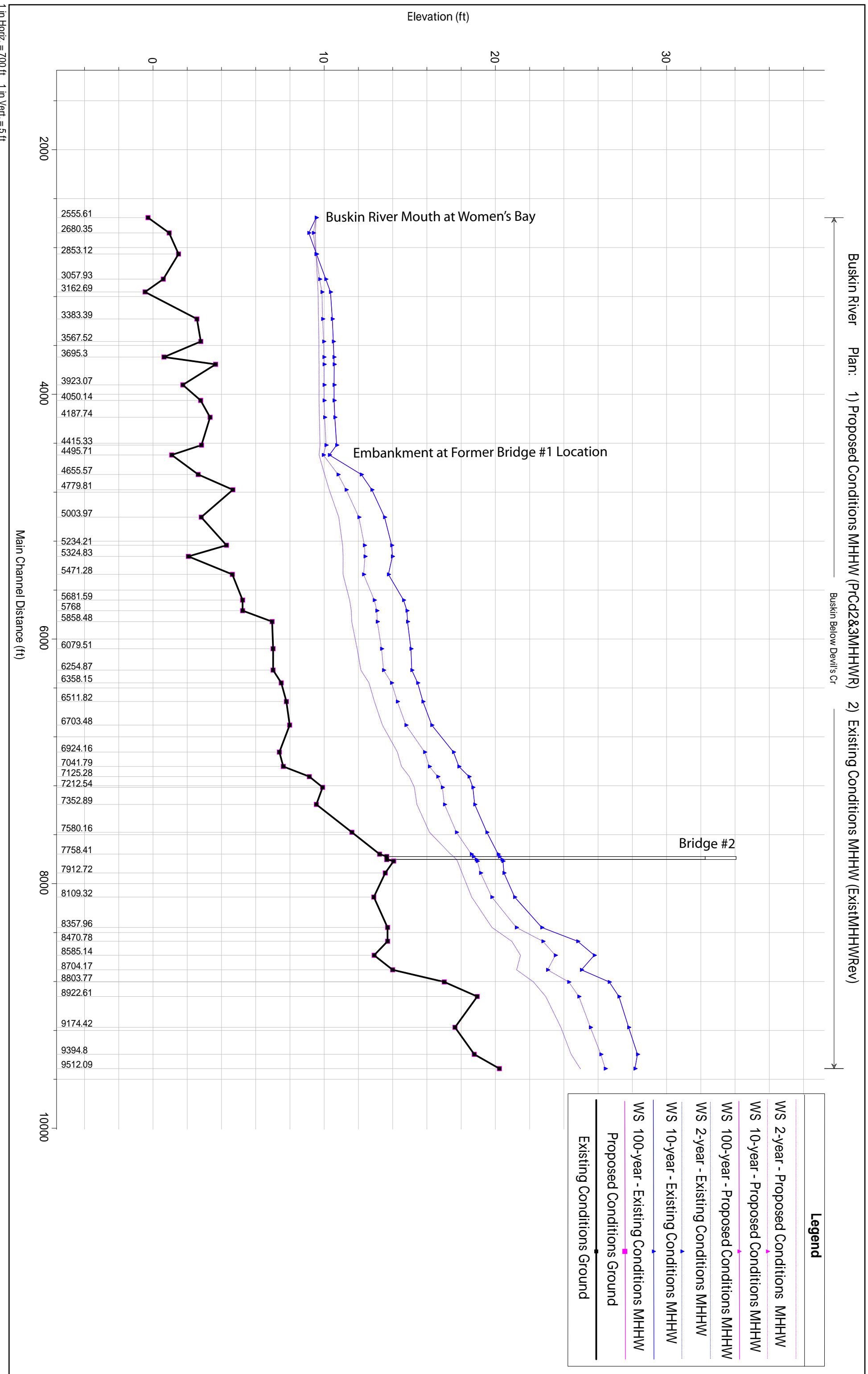
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VIGIL AGRIMIS
design professionals

APPENDIX B

Longitudinal Profiles

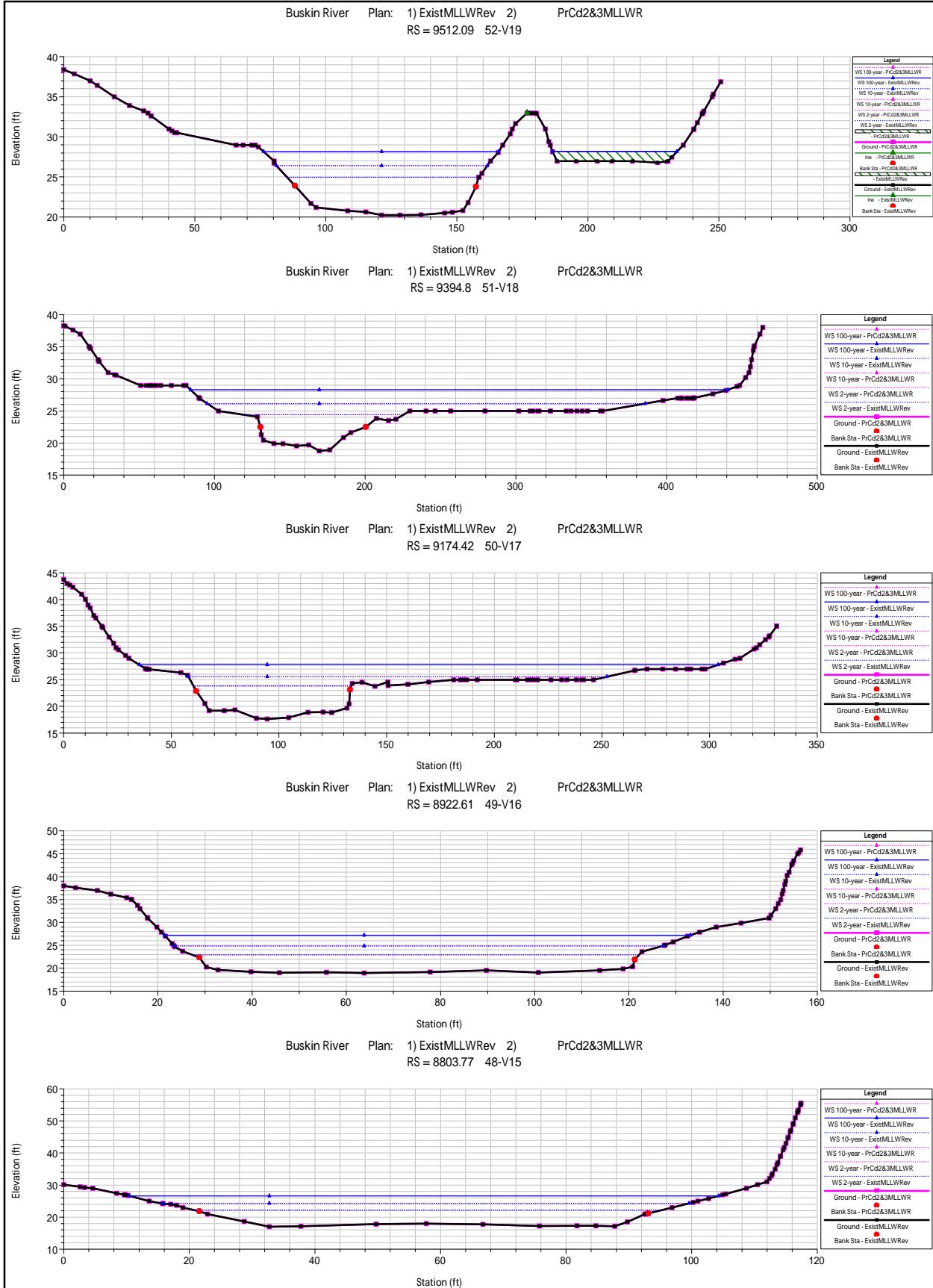




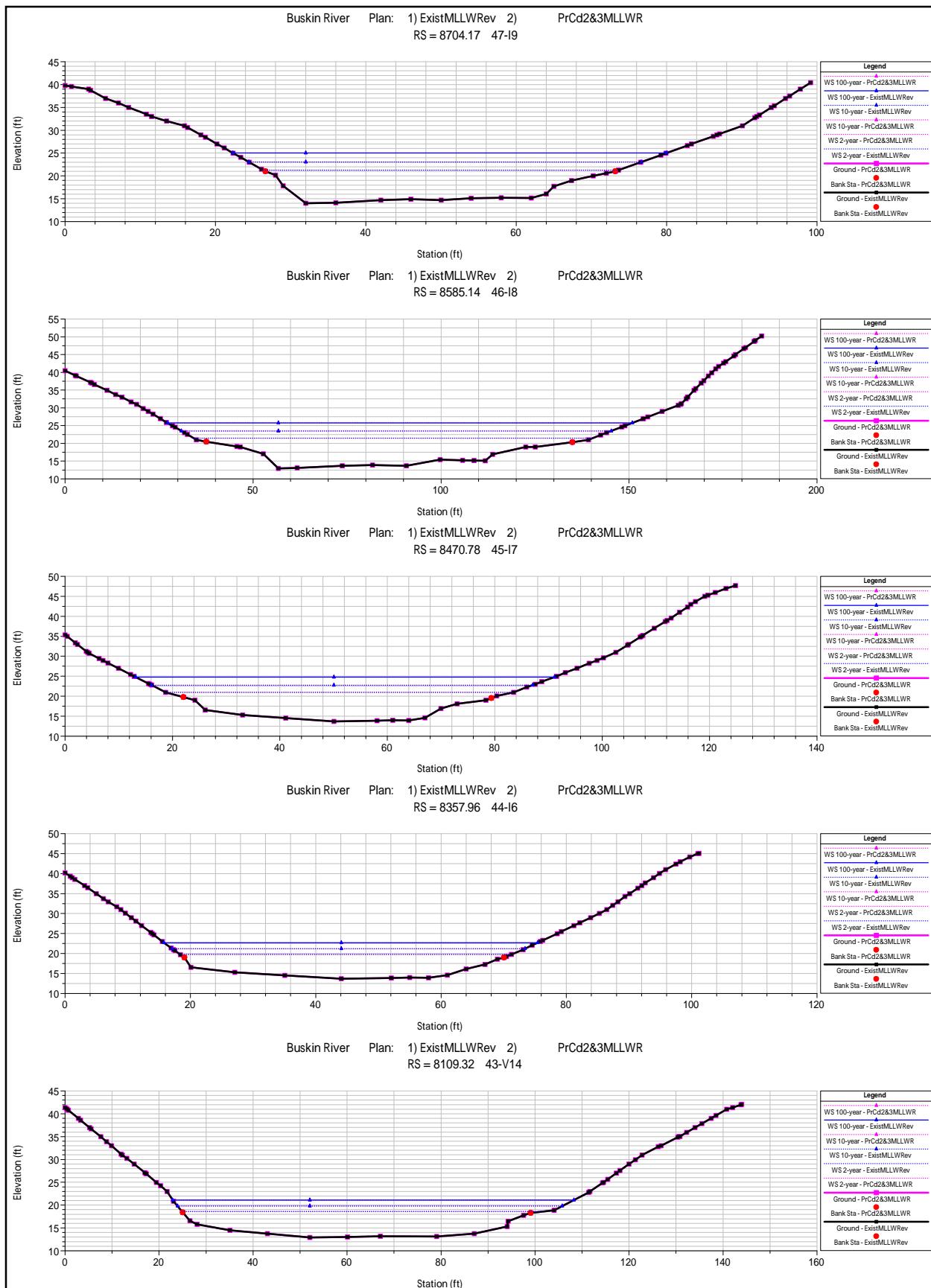
APPENDIX C

Cross-Section Plots of Existing Conditions and Proposed Conditions

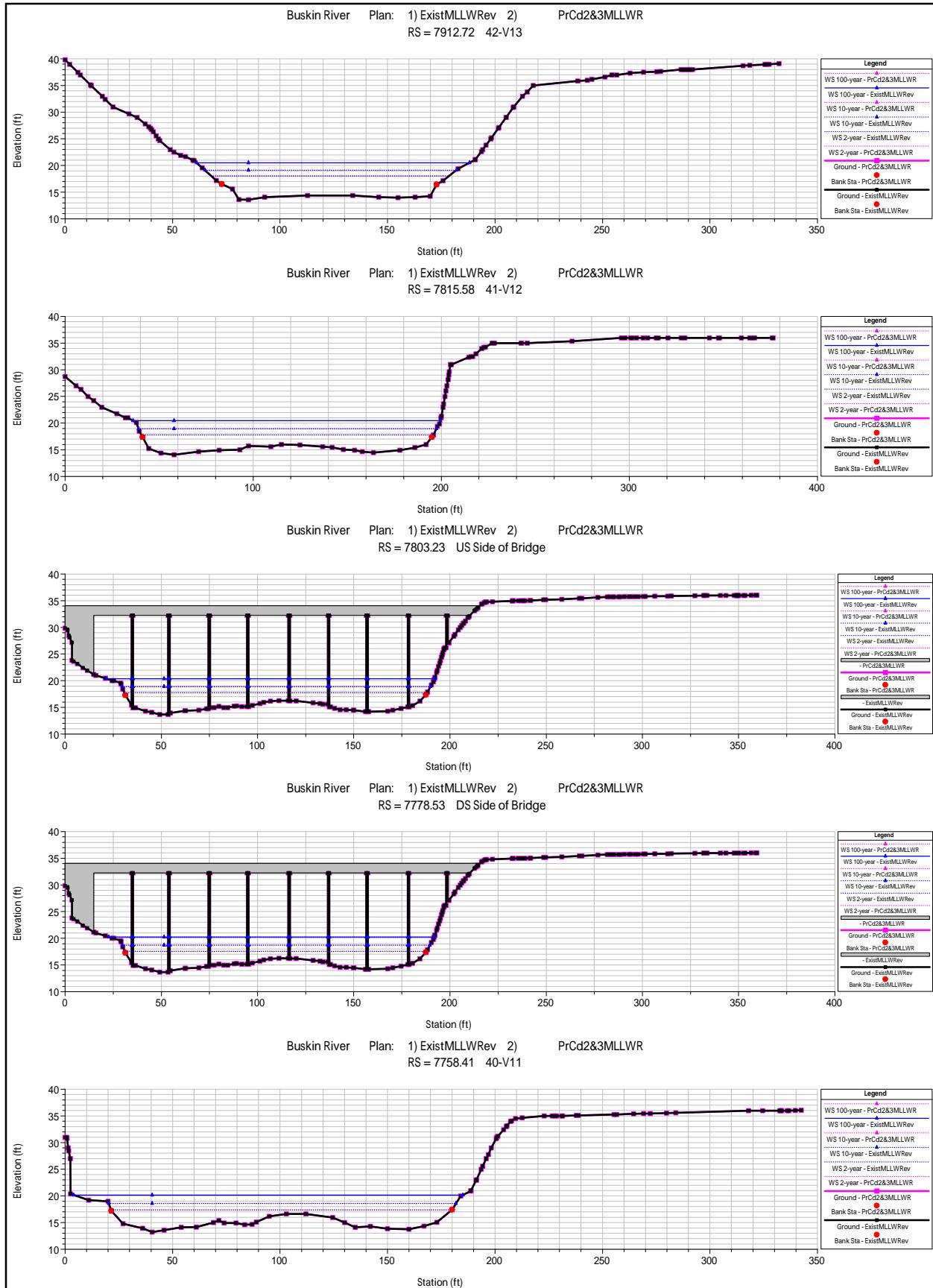
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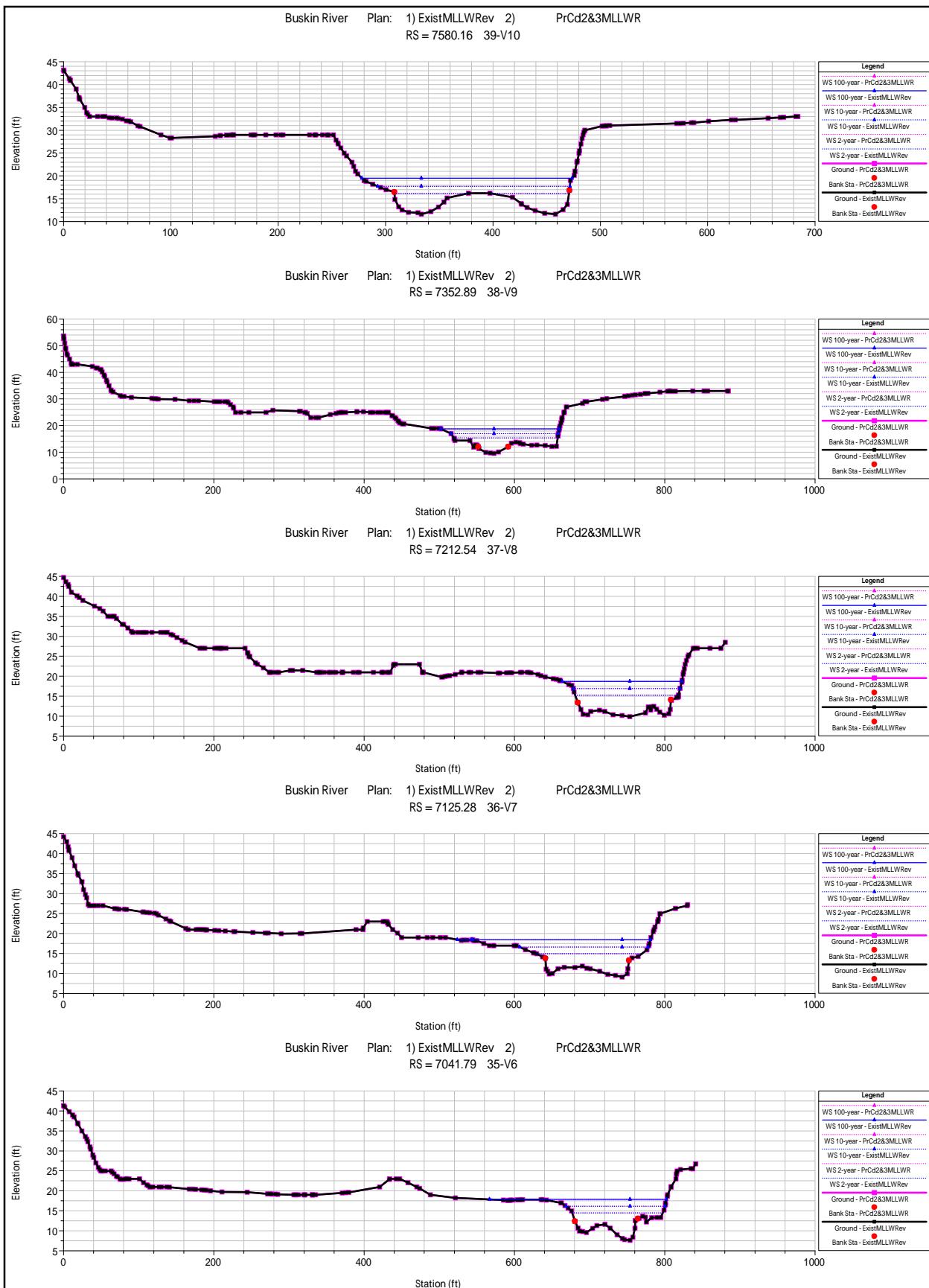
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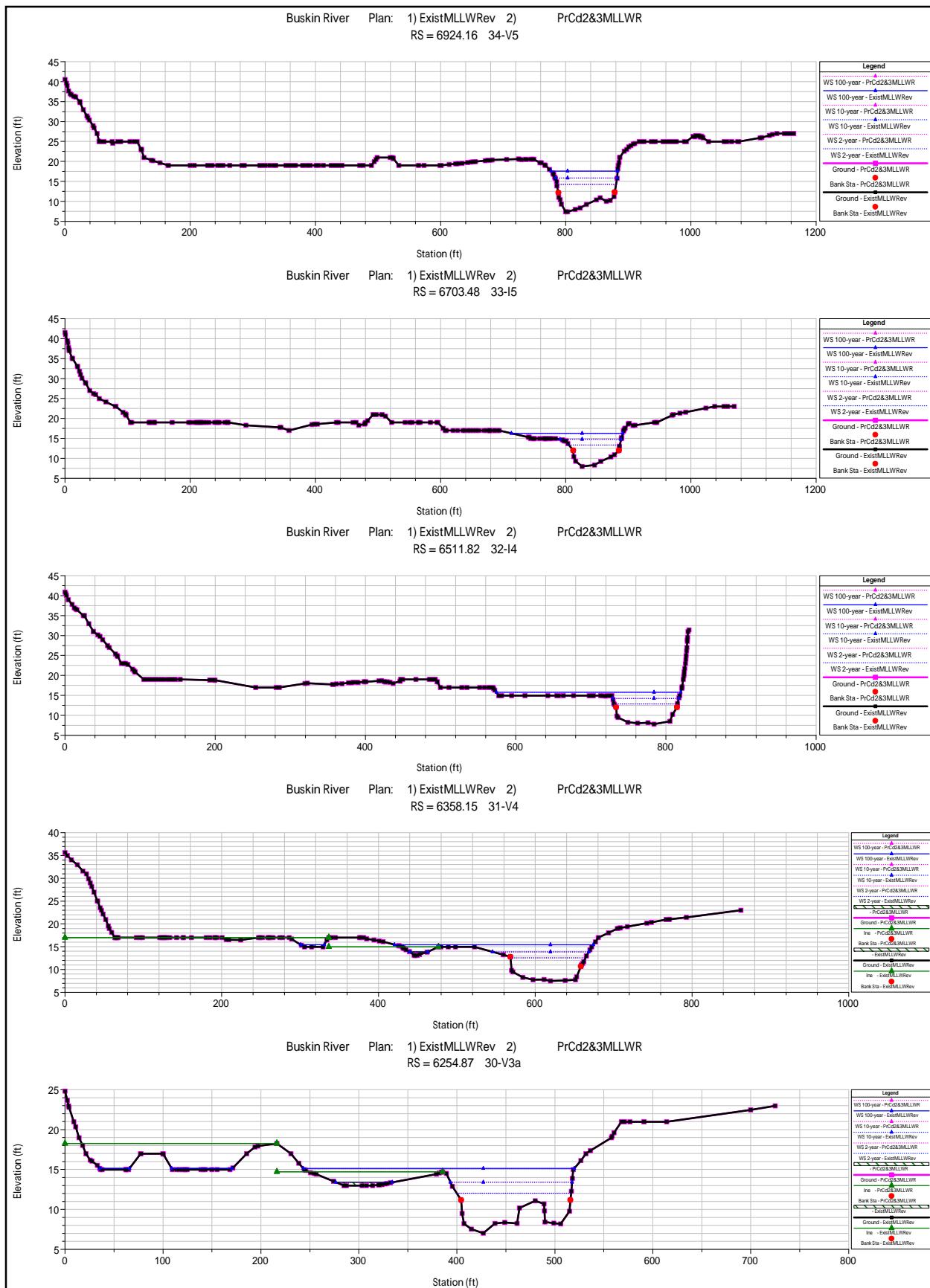
Existing Conditions MLLW (ExistMLLWRev) and Proposed Conditions MLLW (PrCd2&3MLLWR)



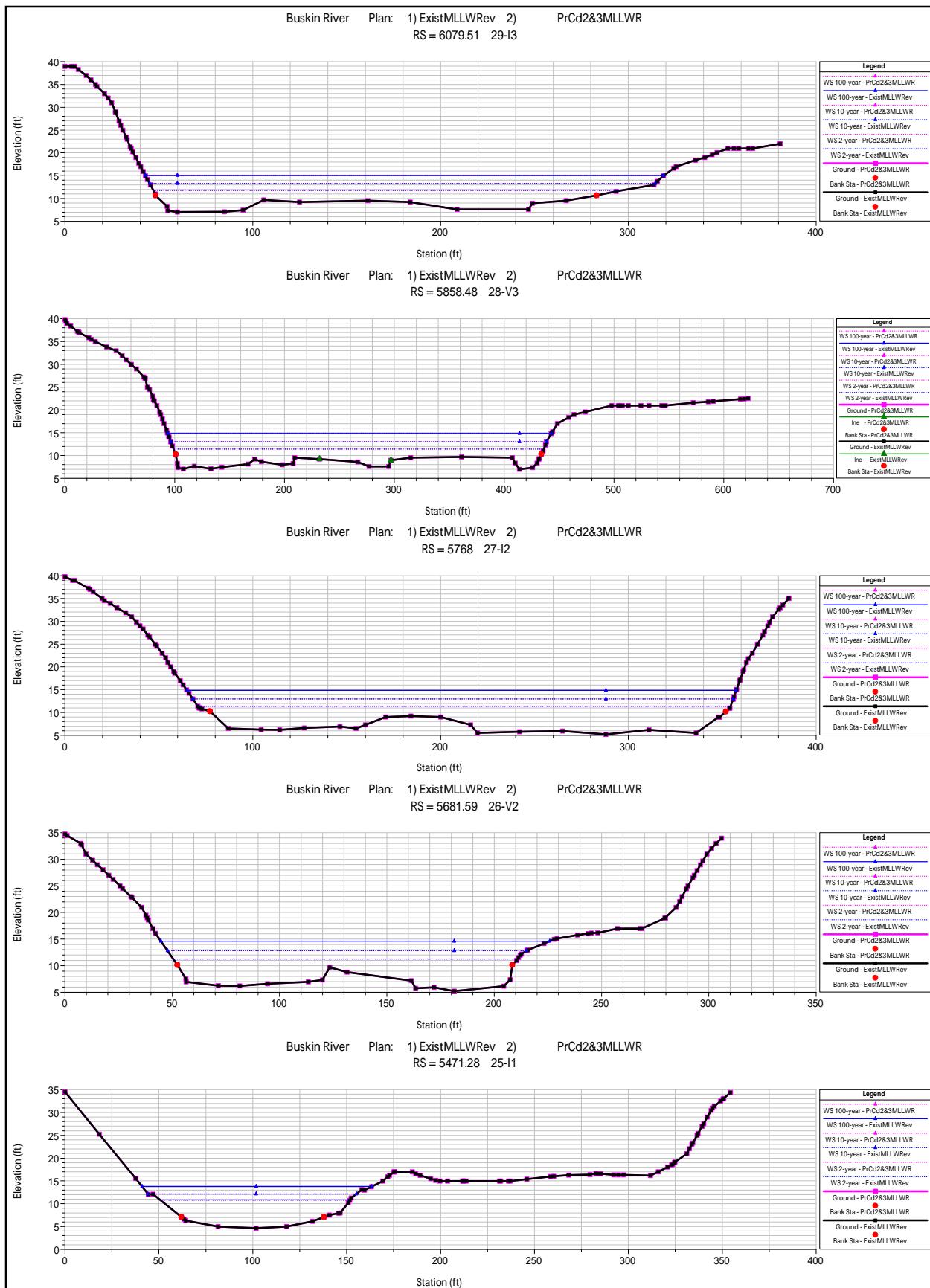
Existing Conditions MLLW (ExistMLLWRev) and Proposed Conditions MLLW (PrCd2&3MLLWR)



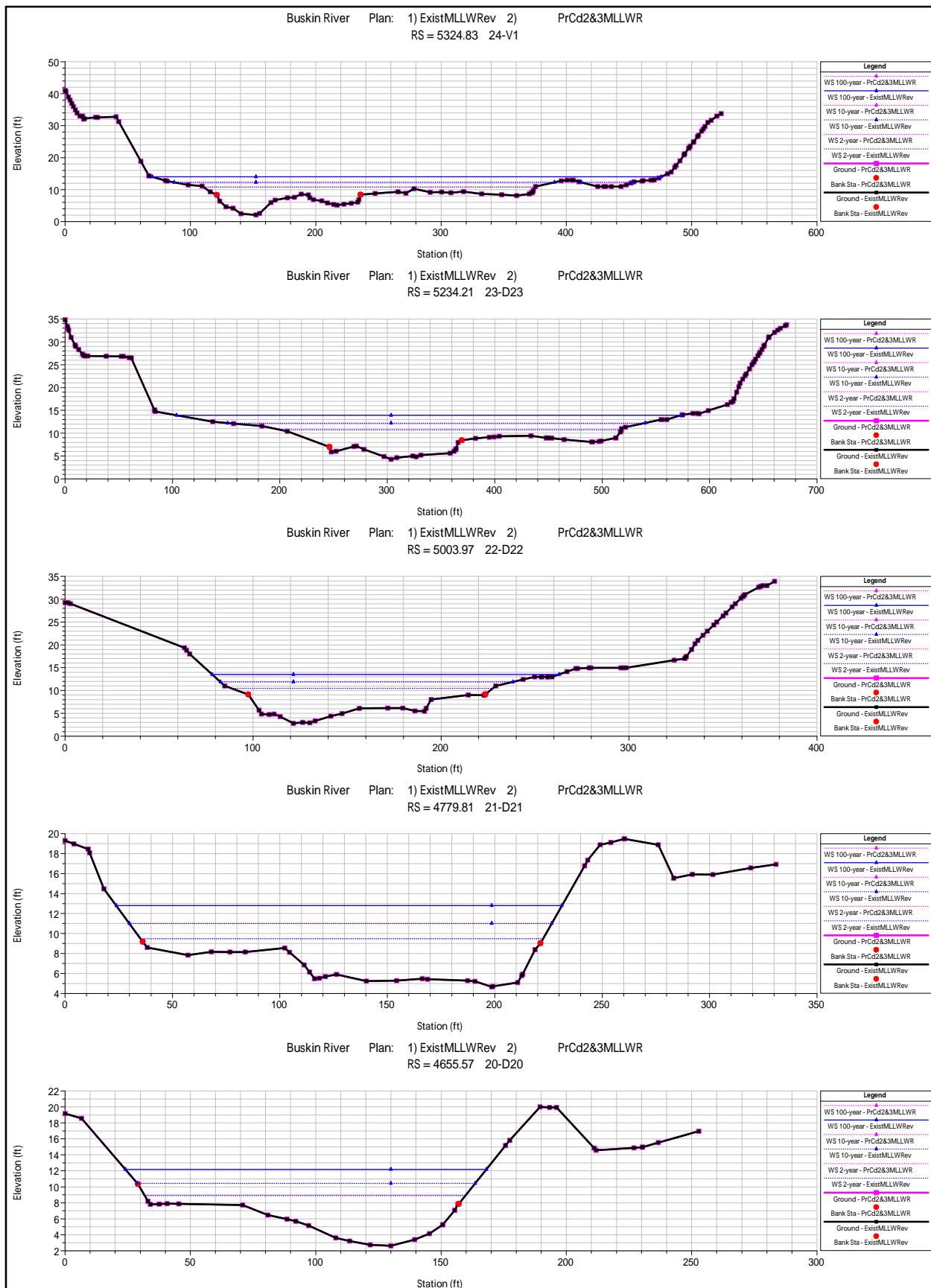
Existing Conditions MLLW (ExistMLLWRev) and Proposed Conditions MLLW (PrCd2&3MLLWR)



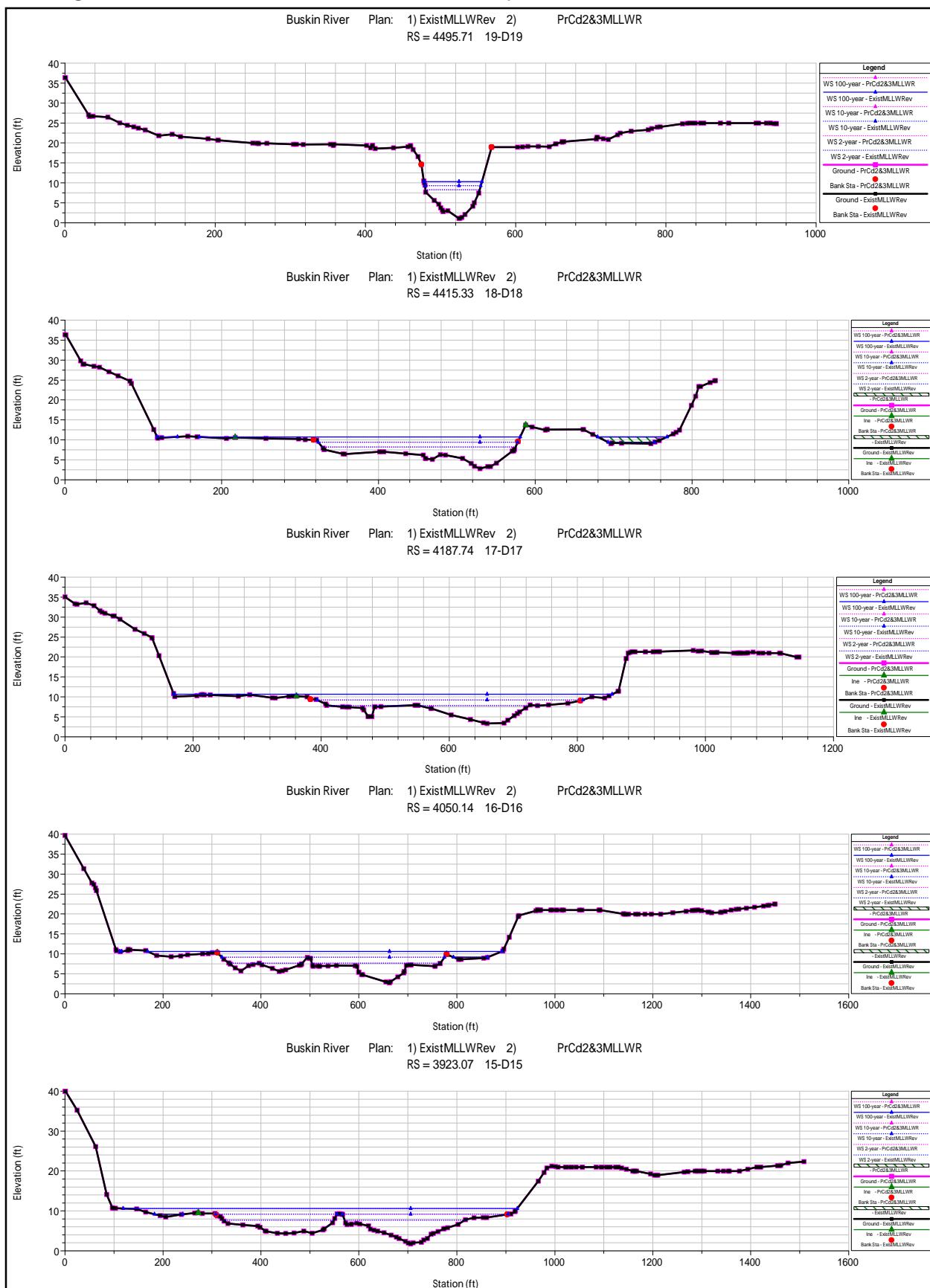
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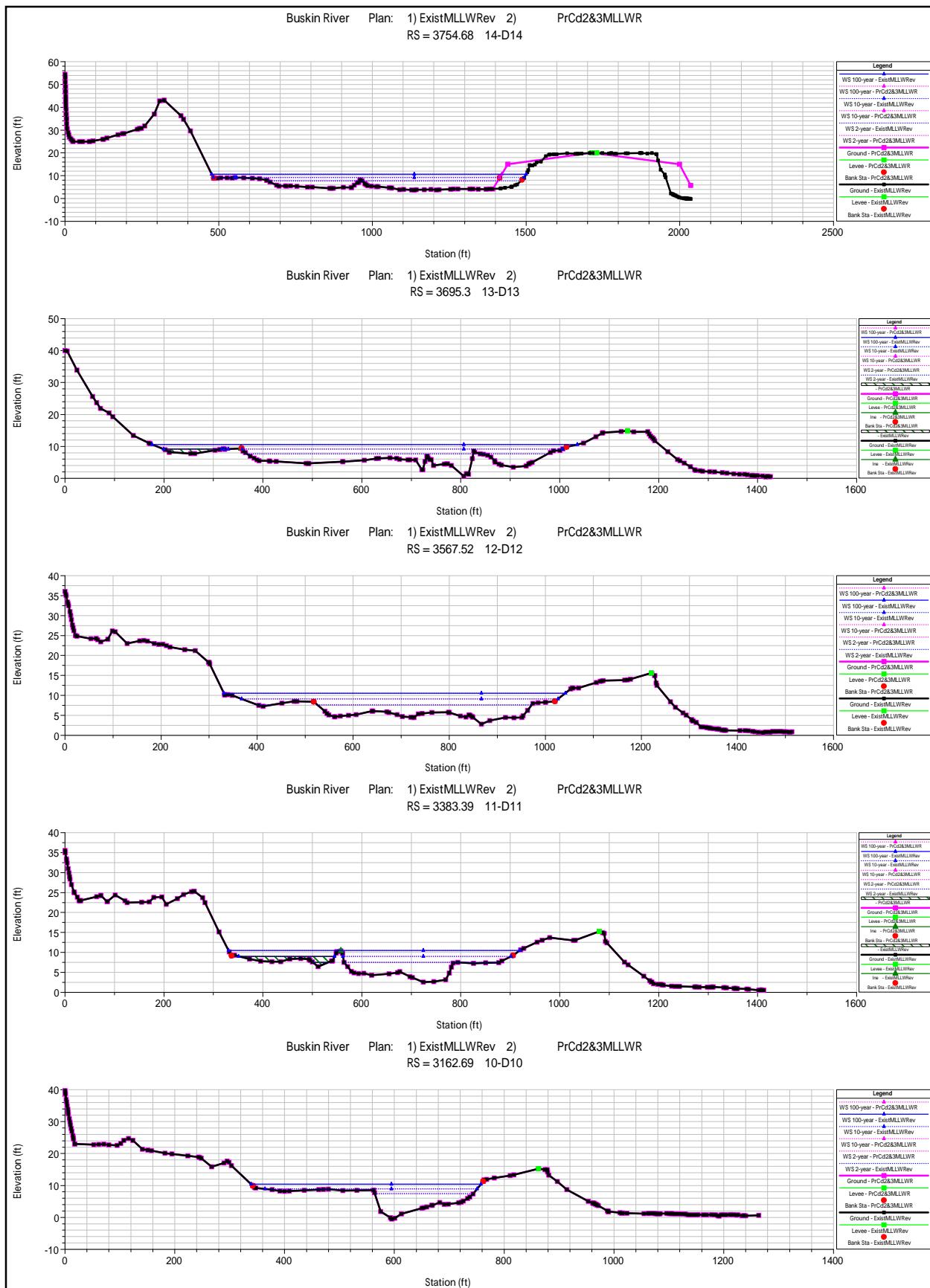
Existing Conditions MLLW (ExistMLLWRev) and Proposed Conditions MLLW (PrCd2&3MLLWR)



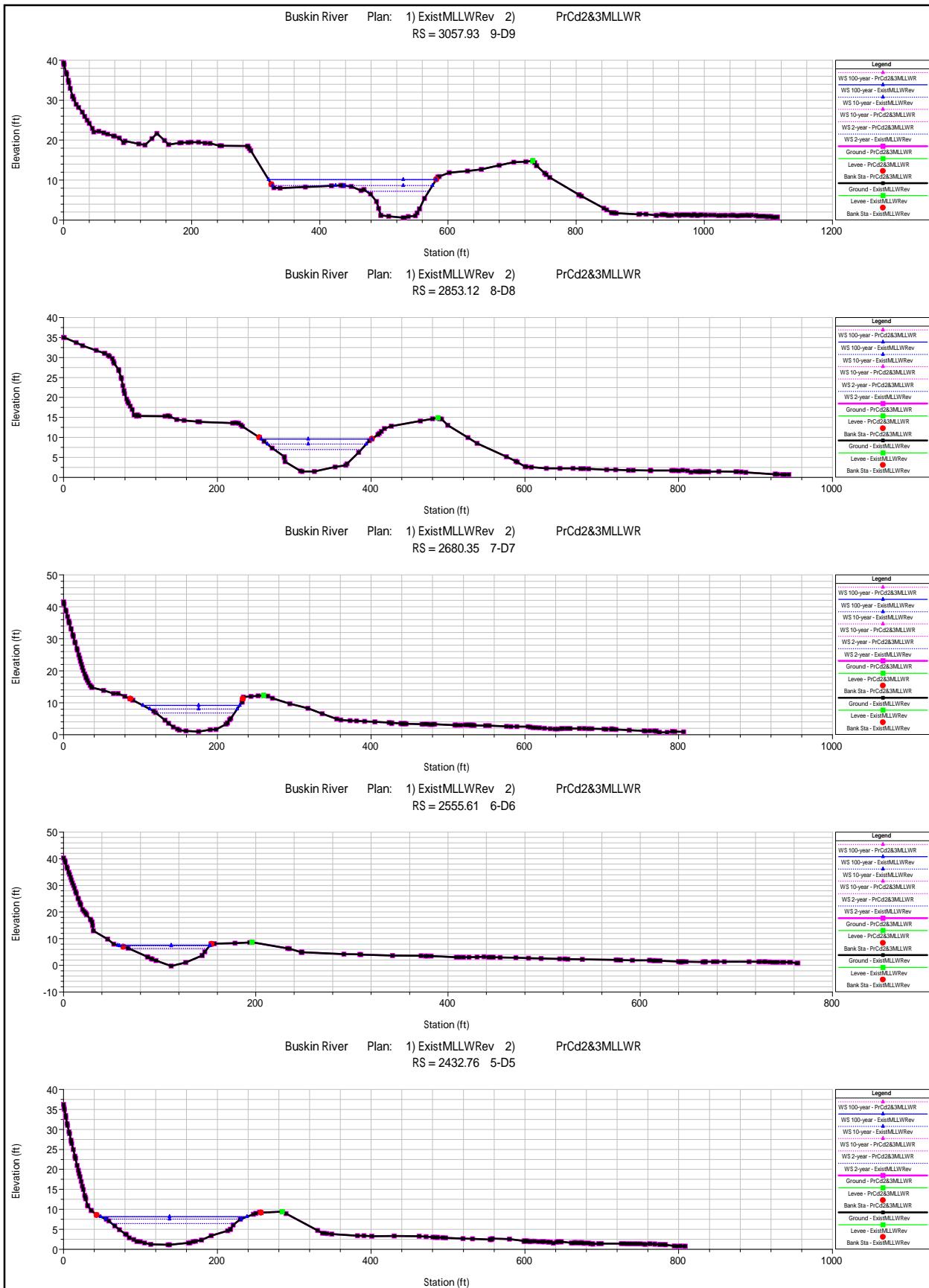
Existing Conditions MLLW (ExistMLLWRev) and Proposed Conditions MLLW (PrCd2&3MLLWR)



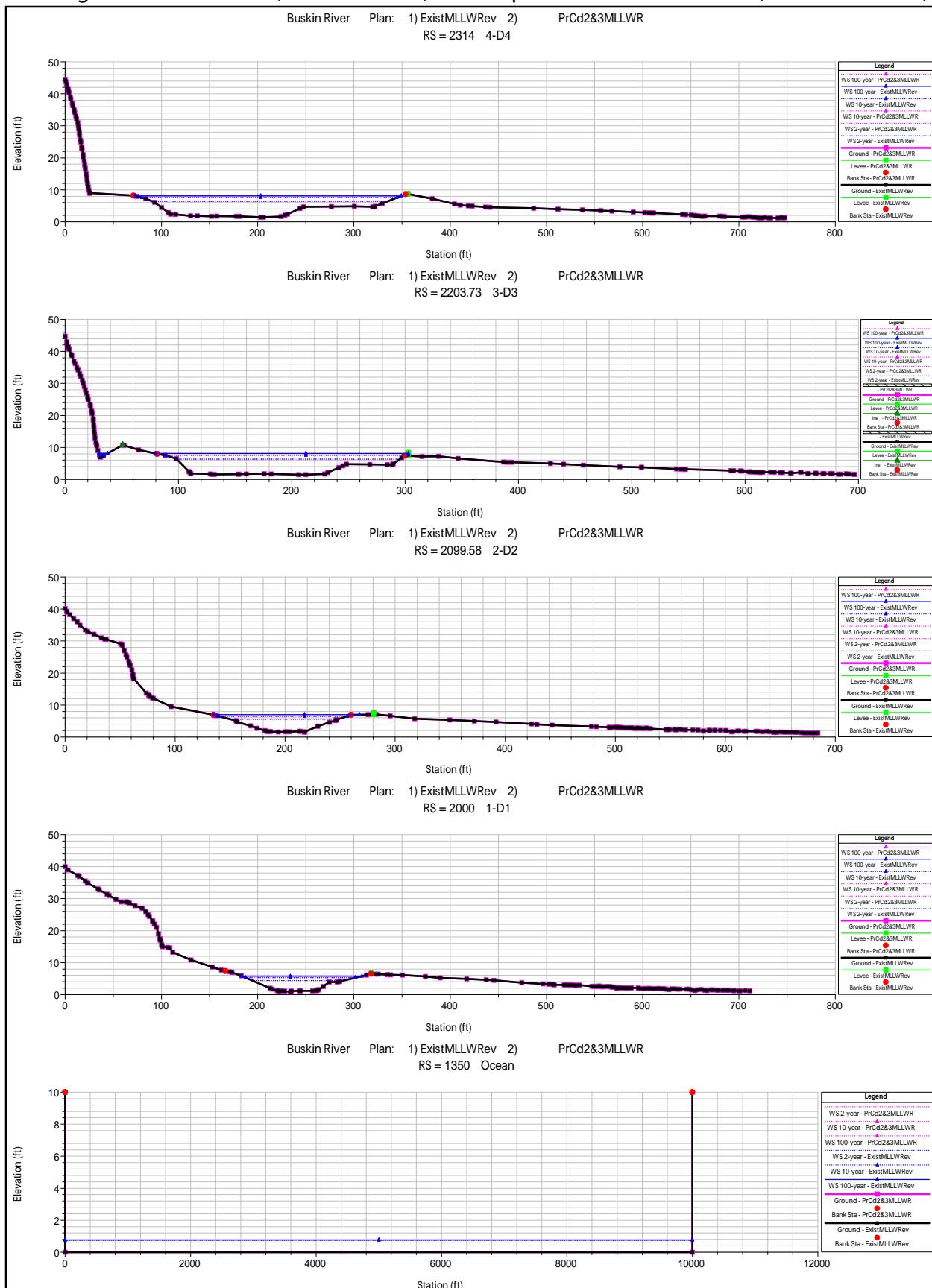
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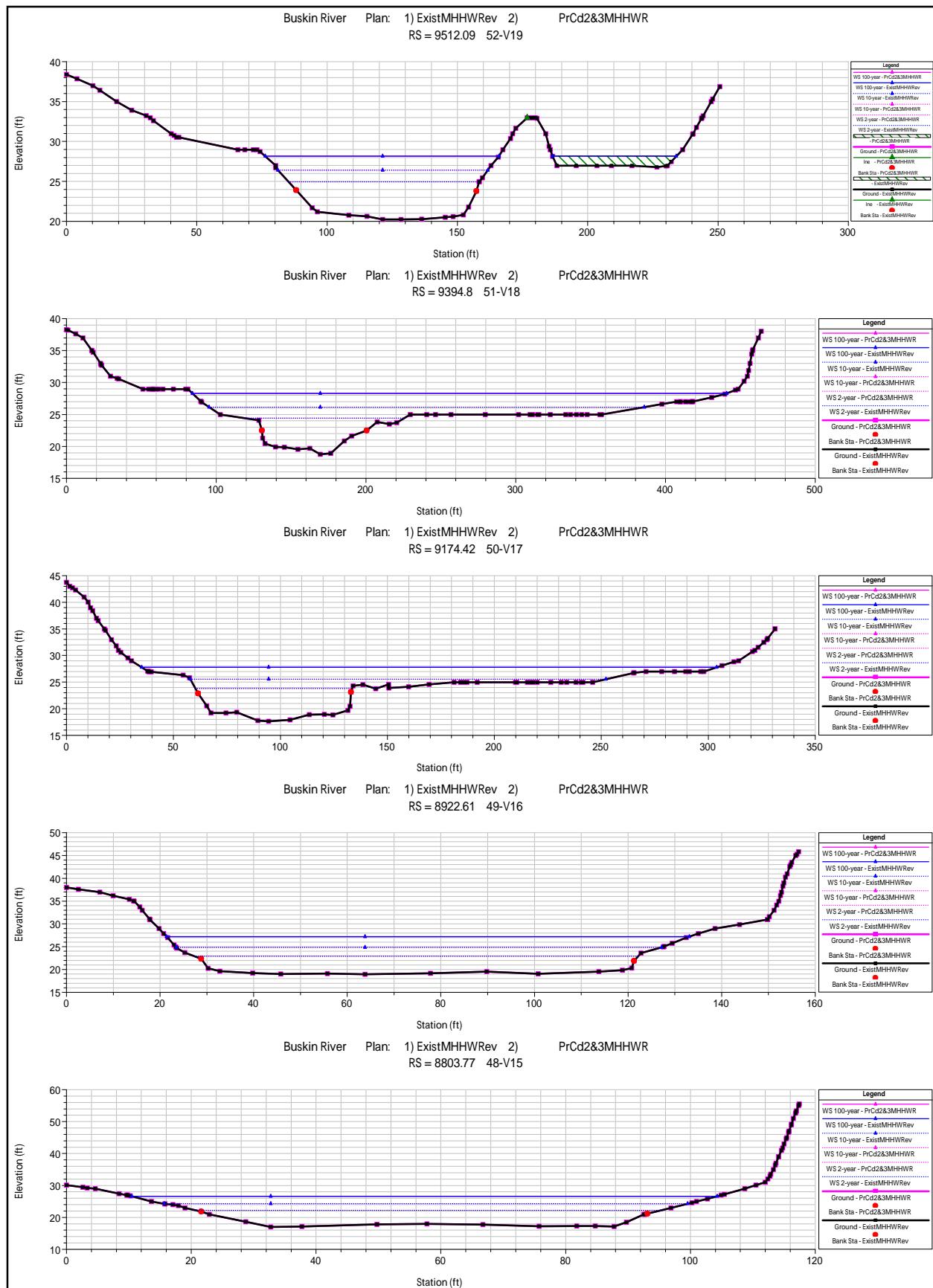
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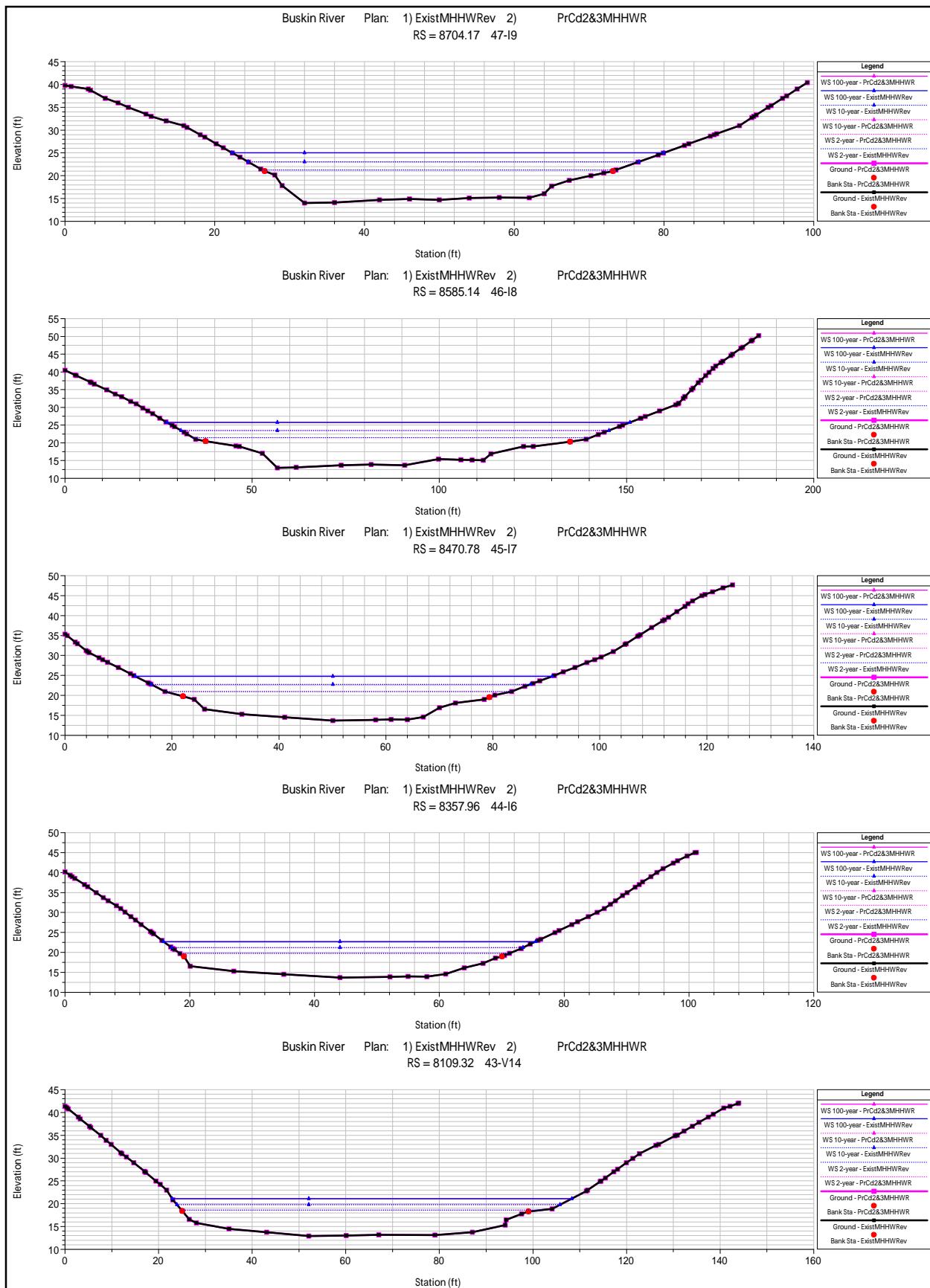
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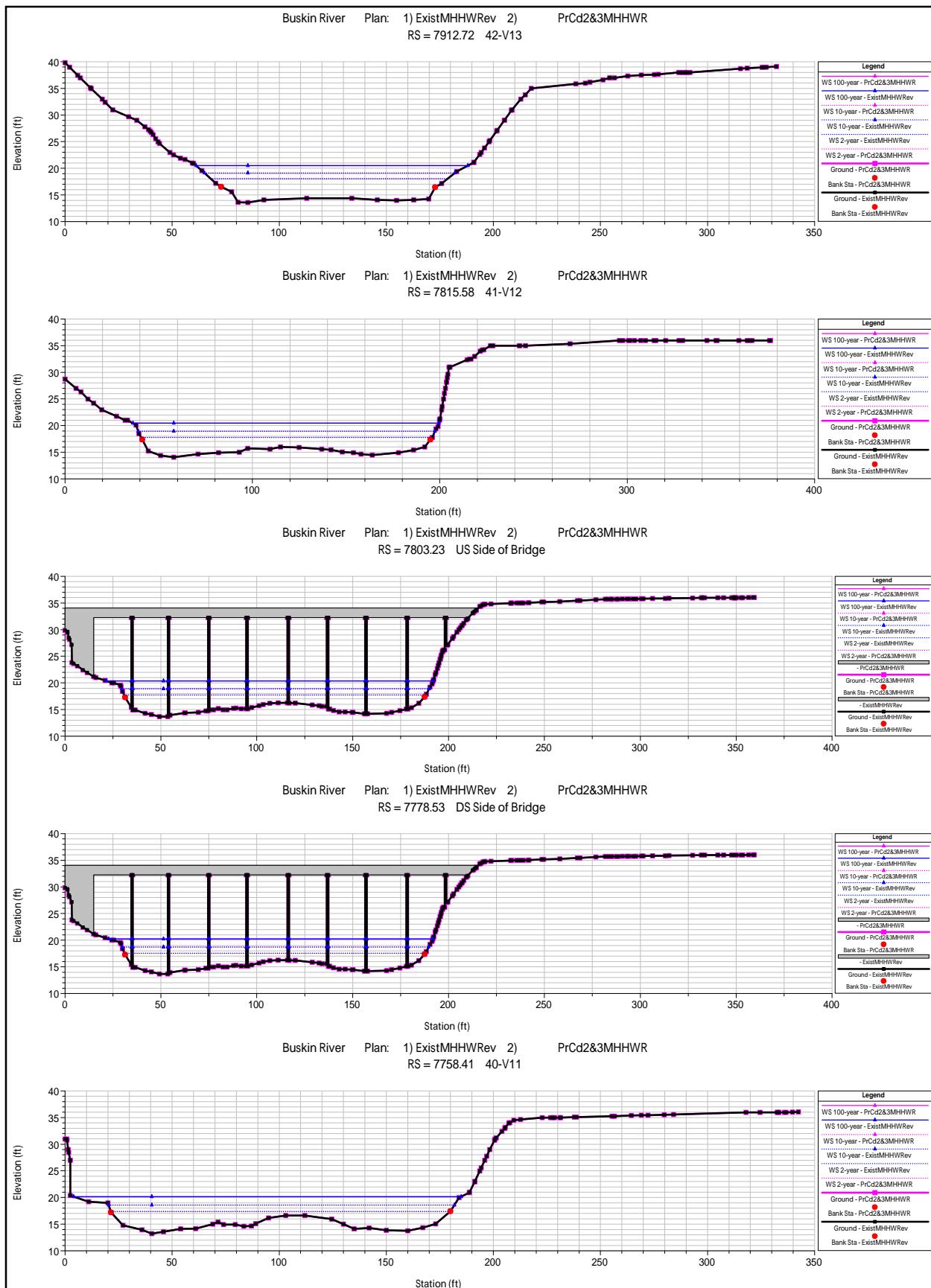
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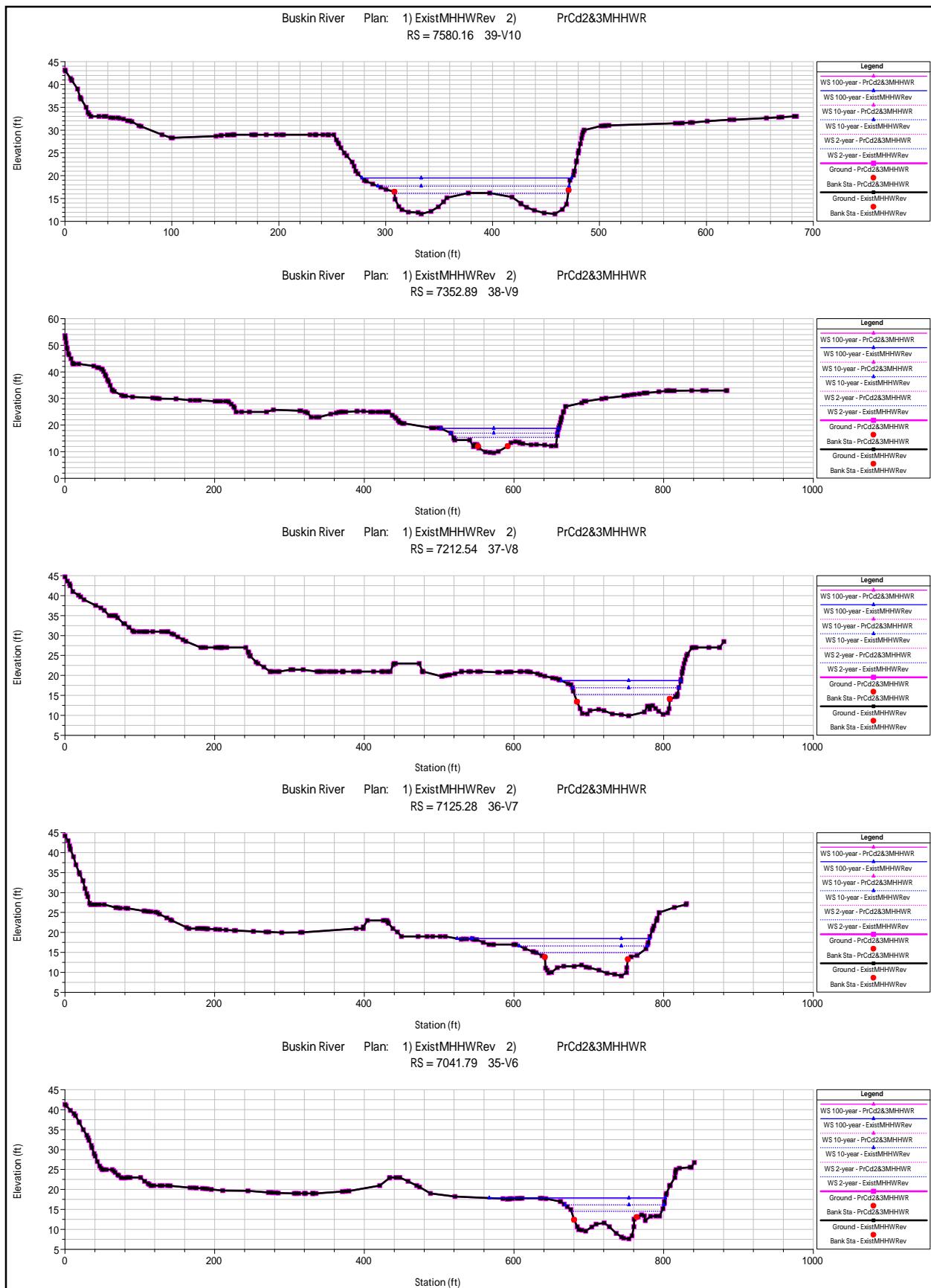
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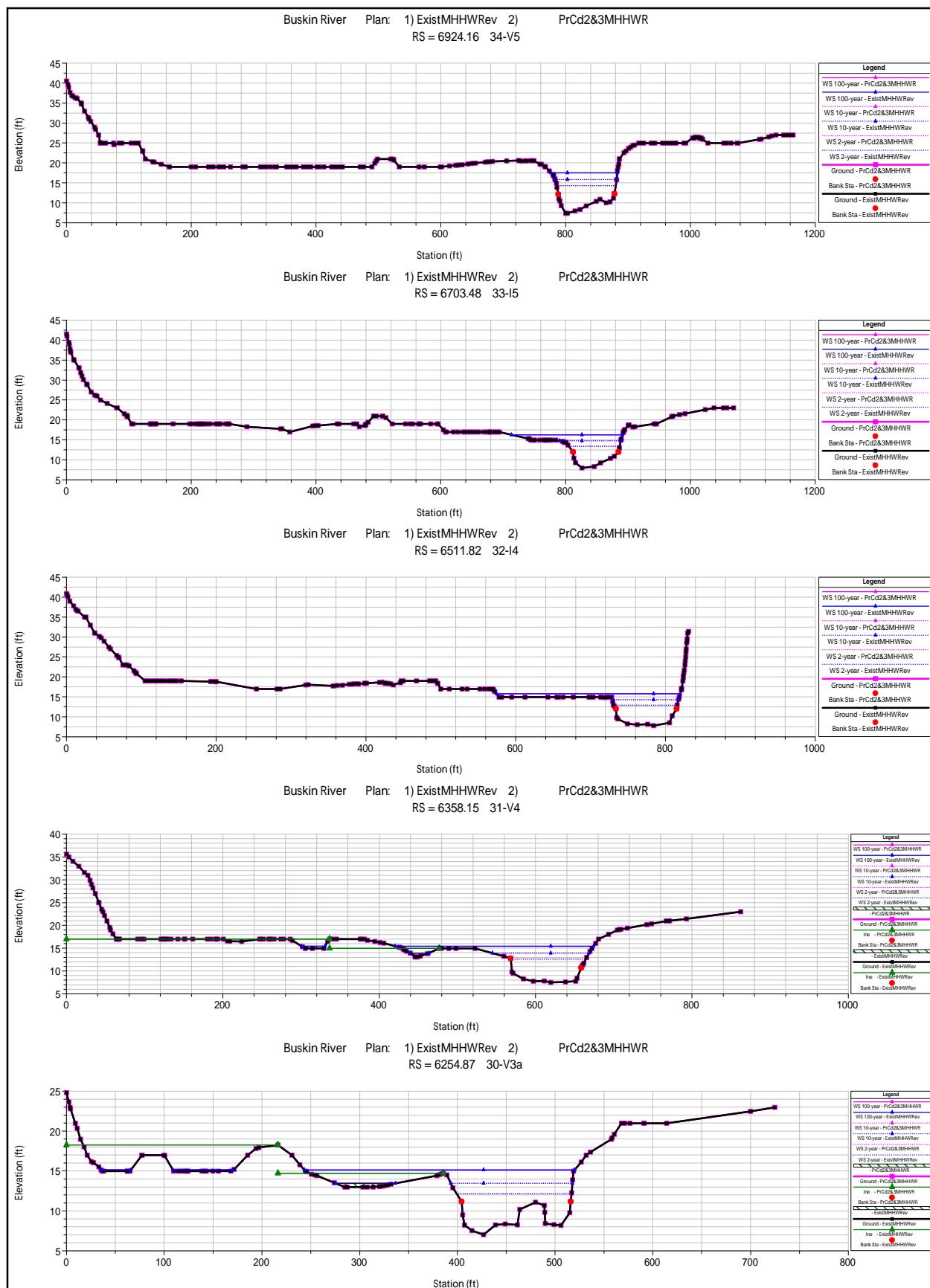
Existing Conditions MHHW (ExistMHHWRev) and Proposed Conditions MHHW (PrCd2&3MHHWR)



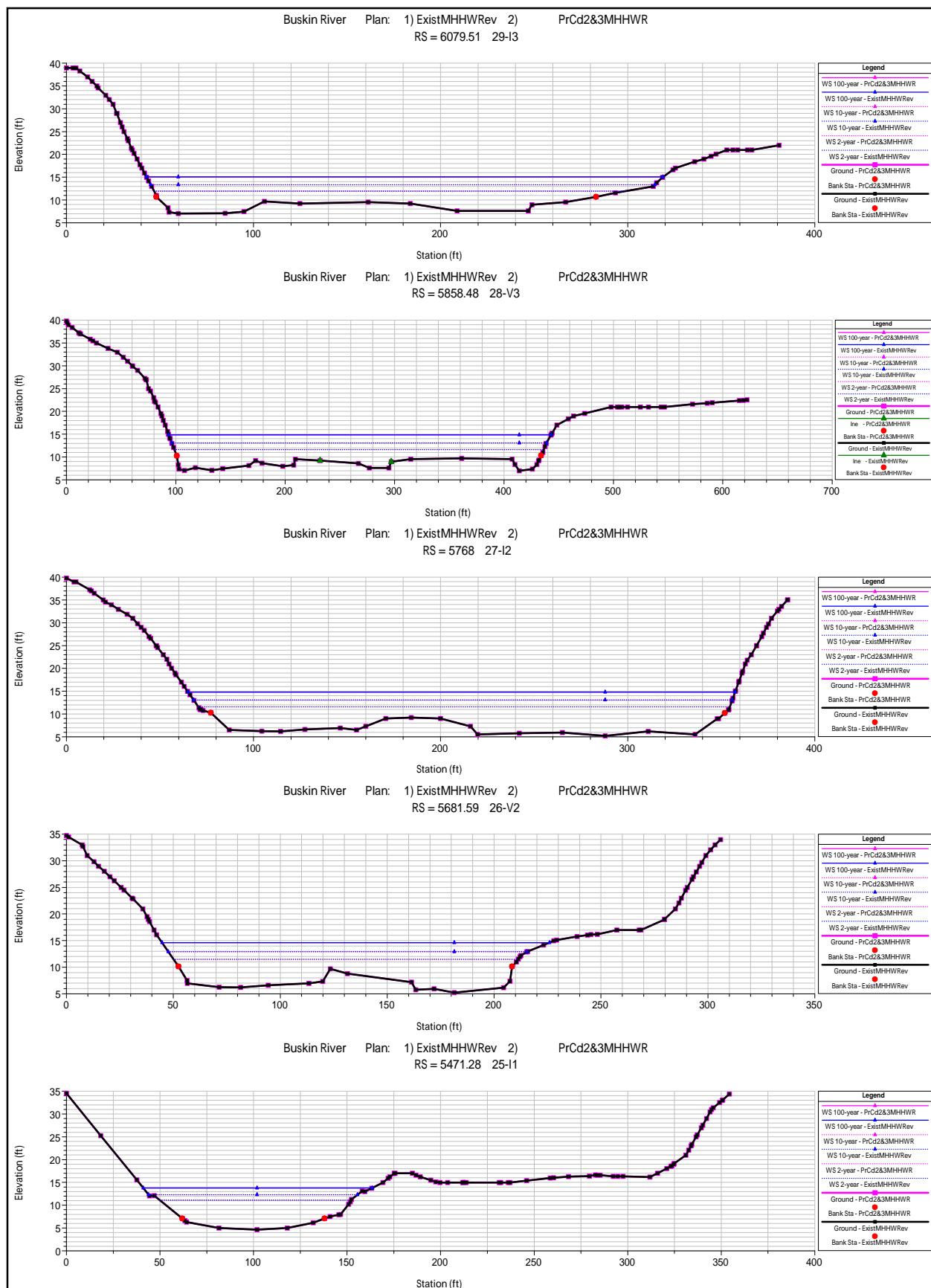
Existing Conditions MHHW (ExistMHHWRev) and Proposed Conditions MHHW (PrCd2&3MHHWR)



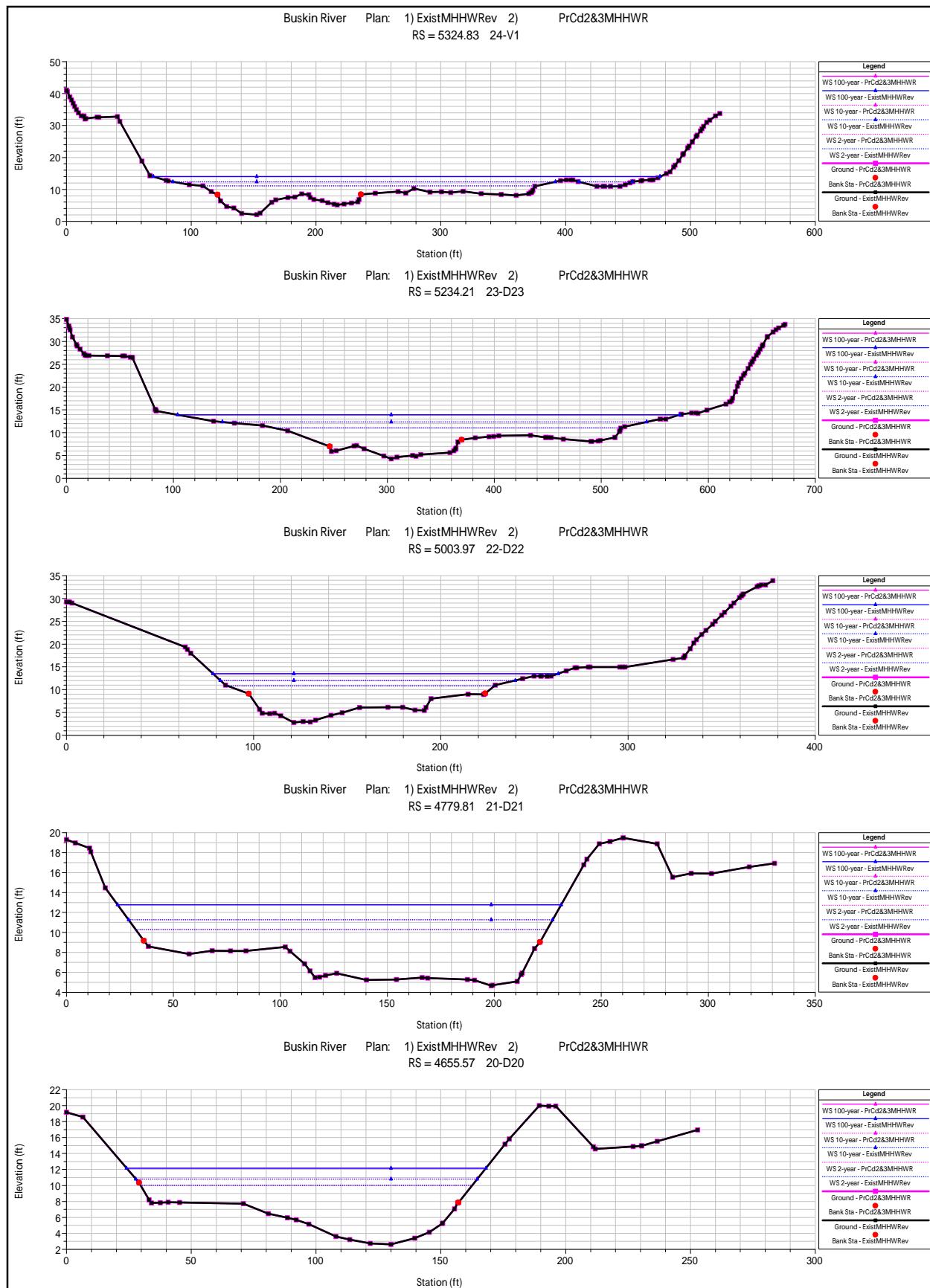
Existing Conditions MHHW (ExistMHHWRev) and Proposed Conditions MHHW (PrCd2&3MHHWR)



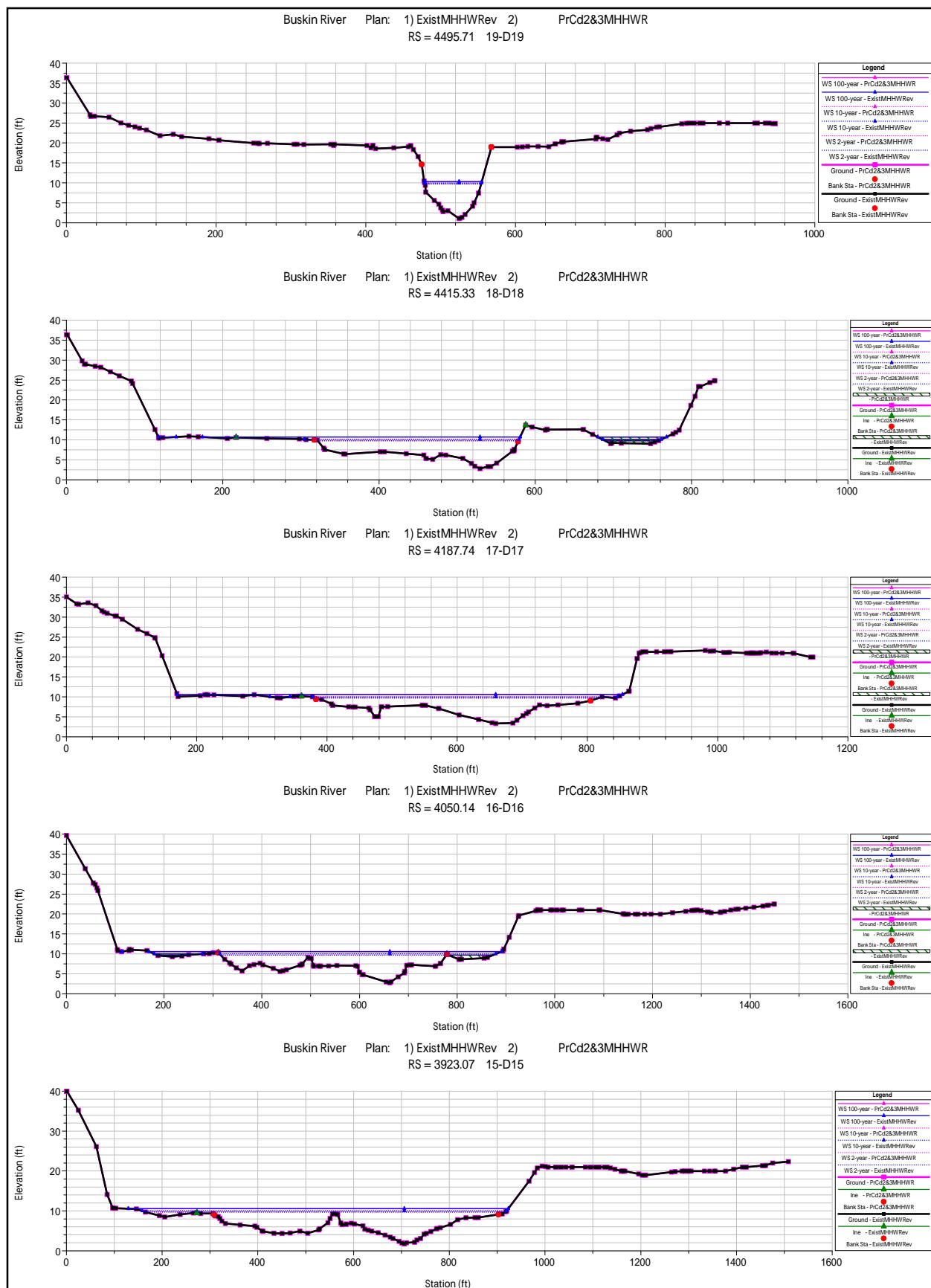
Existing Conditions MHHW (ExistMHHWRev) and Proposed Conditions MHHW (PrCd2&3MHHWR)



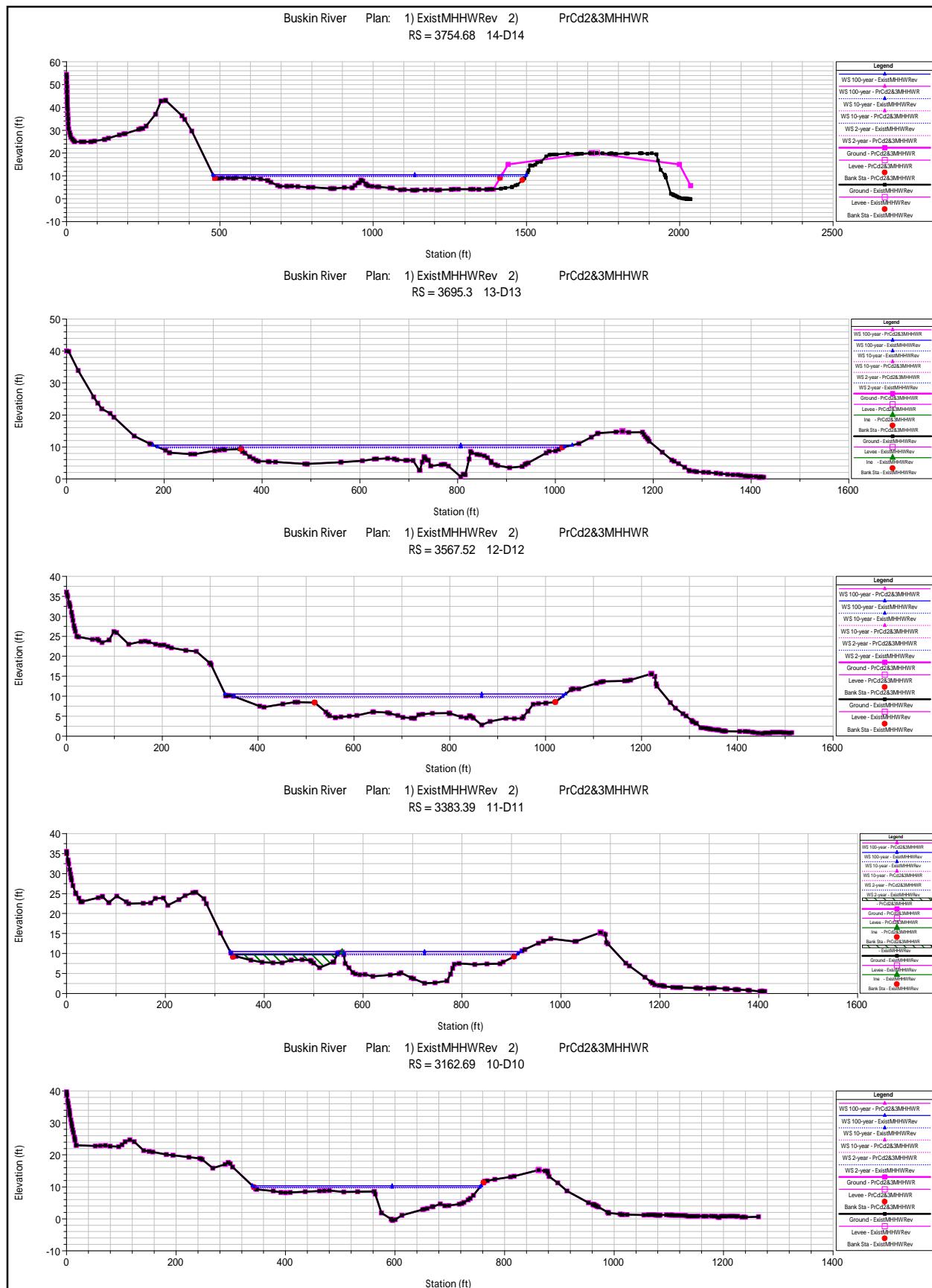
Existing Conditions MHHW (ExistMHHWRev) and Proposed Conditions MHHW (PrCd2&3MHHWR)



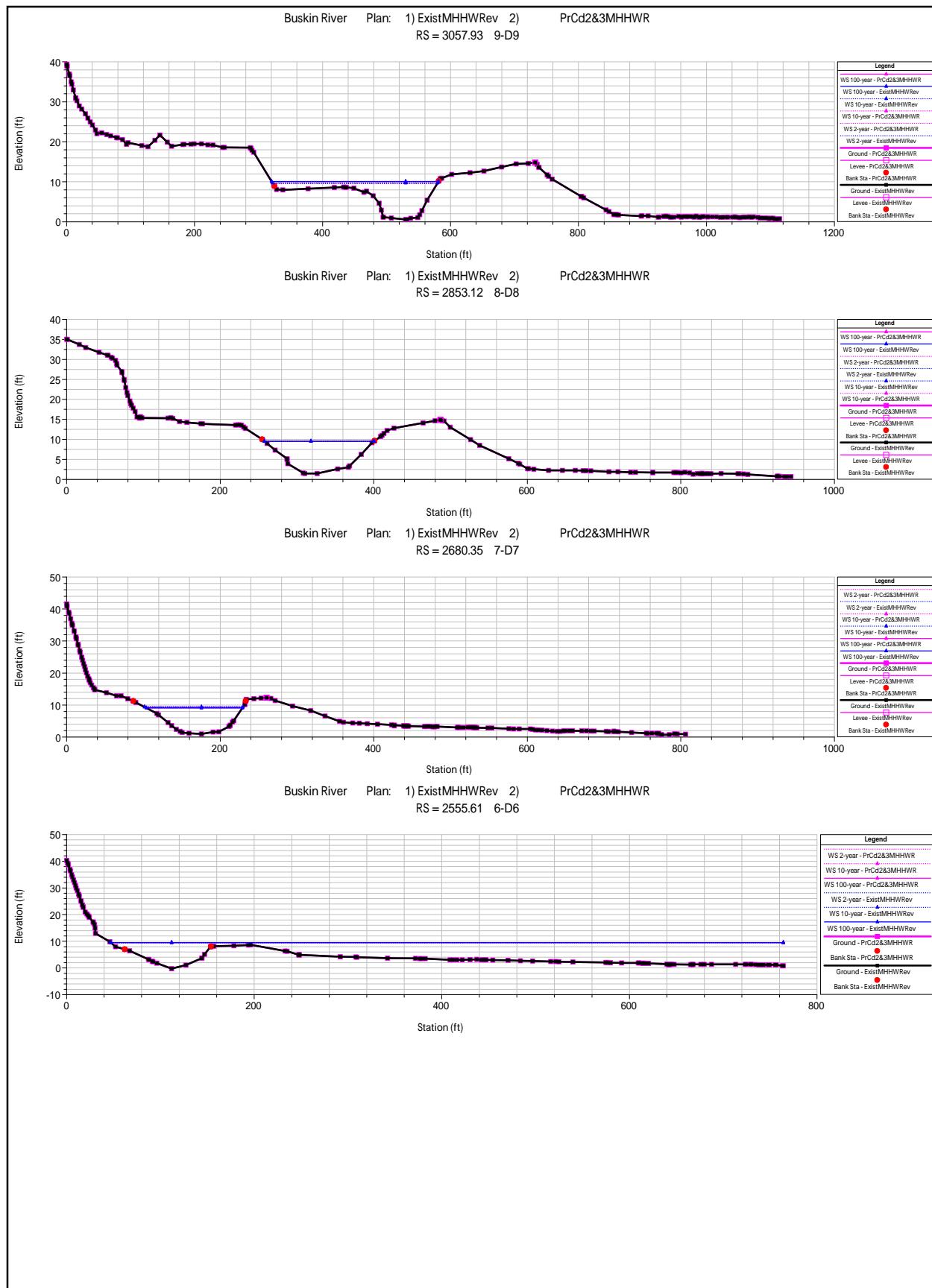
Existing Conditions MHHW (ExistMHHWRev) and Proposed Conditions MHHW (PrCd2&3MHHWR)



Existing Conditions MHHW (ExistMHHWRev) and Proposed Conditions MHHW (PrCd2&3MHHWR)



Existing Conditions MHHW (ExistMHHWRev) and Proposed Conditions MHHW (PrCd2&3MHHWR)



APPENDIX D

Tabular Existing Conditions Model Output

EXISTING CONDITIONS MLLW

Project: Buskin River

Plan: Buskin Existing MLLW Revised

Geometry: Existing Conditions - MLLW Revised

HEC-RAS Plan: ExistMLLWRev River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	9512.09	2-year	1700	20.2	25.0	3.8	23.5	25.5	0.007889	6.1	2.0	283	73	0.53
Below Devil's Cr	9512.09	10-year	2870	20.2	26.4	4.8	24.7	27.3	0.007991	7.5	2.7	395	81	0.56
Below Devil's Cr	9512.09	100-year	4480	20.2	28.2	5.8	26.0	29.3	0.007682	8.8	3.4	542	137	0.58
Below Devil's Cr	9394.8	2-year	1700	18.8	24.4	3.0		24.9	0.003597	5.5	0.9	325	107	0.47
Below Devil's Cr	9394.8	10-year	2870	18.8	26.2	2.4		26.6	0.002644	5.9	1.0	711	291	0.43
Below Devil's Cr	9394.8	100-year	4480	18.8	28.3	3.9		28.7	0.001676	5.8	0.8	1414	357	0.36
Below Devil's Cr	9174.42	2-year	1700	17.6	23.8	4.5		24.2	0.002635	4.8	0.8	355	74	0.38
Below Devil's Cr	9174.42	10-year	2870	17.6	25.6	2.9		26.1	0.002640	5.9	1.1	580	194	0.40
Below Devil's Cr	9174.42	100-year	4480	17.6	27.8	4.0		28.3	0.002007	6.2	1.1	1090	269	0.37
Below Devil's Cr	8922.61	2-year	1700	18.9	22.9	3.4		23.3	0.004342	5.1	1.0	336	95	0.47
Below Devil's Cr	8922.61	10-year	2870	18.9	24.9	4.9		25.4	0.002952	5.6	1.0	528	104	0.42
Below Devil's Cr	8922.61	100-year	4480	18.9	27.2	6.7		27.8	0.002204	6.1	1.1	780	112	0.38
Below Devil's Cr	8803.77	2-year	1700	17.0	22.2	4.0		22.7	0.006663	5.5	1.7	309	75	0.47
Below Devil's Cr	8803.77	10-year	2870	17.0	24.3	5.4		24.9	0.005107	6.3	2.0	471	84	0.44
Below Devil's Cr	8803.77	100-year	4480	17.0	26.7	6.9		27.4	0.004227	7.1	2.2	682	94	0.42
Below Devil's Cr	8704.17	2-year	1700	14.0	21.2	4.6		22.0	0.006849	7.0	2.0	244	47	0.54
Below Devil's Cr	8704.17	10-year	2870	14.0	23.1	5.7		24.2	0.007265	8.7	2.9	334	52	0.58
Below Devil's Cr	8704.17	100-year	4480	14.0	25.0	6.7		26.8	0.007682	10.6	3.9	442	58	0.62
Below Devil's Cr	8585.14	2-year	1700	12.9	21.5	4.9		21.6	0.000718	3.2	0.2	542	106	0.24
Below Devil's Cr	8585.14	10-year	2870	12.9	23.5	6.4		23.7	0.000800	3.9	0.4	765	114	0.25
Below Devil's Cr	8585.14	100-year	4480	12.9	25.8	8.0		26.1	0.000856	4.6	0.5	1036	124	0.26
Below Devil's Cr	8470.78	2-year	1700	13.7	21.0	4.7		21.4	0.006088	5.4	2.0	319	65	0.41
Below Devil's Cr	8470.78	10-year	2870	13.7	22.8	5.9		23.5	0.006572	6.8	2.9	442	71	0.44
Below Devil's Cr	8470.78	100-year	4480	13.7	24.8	7.1		25.8	0.006866	8.2	3.8	593	78	0.47
Below Devil's Cr	8357.96	2-year	1700	13.7	19.8	4.4		20.5	0.009431	6.9	2.7	247	53	0.55
Below Devil's Cr	8357.96	10-year	2870	13.7	21.2	5.3		22.5	0.011299	9.0	4.2	325	56	0.63
Below Devil's Cr	8357.96	100-year	4480	13.7	22.7	6.3		24.7	0.013435	11.3	6.1	411	60	0.72
Below Devil's Cr	8109.32	2-year	1700	12.9	18.6	4.3		19.0	0.003866	5.0	1.1	339	77	0.41
Below Devil's Cr	8109.32	10-year	2870	12.9	19.8	5.1		20.5	0.005112	6.7	1.8	433	82	0.50
Below Devil's Cr	8109.32	100-year	4480	12.9	21.1	6.1		22.2	0.006159	8.5	2.6	545	85	0.56
Below Devil's Cr	7912.72	2-year	1700	13.6	18.1	3.4		18.4	0.002592	4.5	0.6	384	111	0.41
Below Devil's Cr	7912.72	10-year	2870	13.6	19.1	4.3		19.7	0.003145	5.9	0.9	507	117	0.47

EXISTING CONDITIONS MLLW

Project: Buskin River

Plan: Buskin Existing MLLW Revised

Geometry: Existing Conditions - MLLW Revised

HEC-RAS Plan: ExistMLLWRev River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	7912.72	100-year	4480	13.6	20.5	5.2		21.3	0.003284	7.1	1.3	674	127	0.50
Below Devil's Cr	7815.58	2-year	1700	14.1	17.8	2.6		18.1	0.003672	4.2	0.6	401	155	0.46
Below Devil's Cr	7815.58	10-year	2870	14.1	18.9	3.6		19.3	0.003055	4.9	0.7	583	158	0.45
Below Devil's Cr	7815.58	100-year	4480	14.1	20.4	5.0		20.9	0.002401	5.5	0.8	825	163	0.42
Below Devil's Cr	7803.23	2-year	1700	13.7	17.7	2.1	16.6	18.0	0.004905	4.2	0.6	403	151	0.45
Below Devil's Cr	7803.23	10-year	2870	13.7	18.9	2.7	17.3	19.3	0.004792	5.0	0.8	578	154	0.45
Below Devil's Cr	7803.23	100-year	4480	13.7	20.4	3.2	18.1	20.9	0.004472	5.6	0.9	814	164	0.43
Below Devil's Cr	7778.53	2-year	1700	13.7	17.6	2.0	16.6	17.9	0.006050	4.5	0.7	376	150	0.50
Below Devil's Cr	7778.53	10-year	2870	13.7	18.7	2.6	17.3	19.1	0.005467	5.2	0.9	553	153	0.48
Below Devil's Cr	7778.53	100-year	4480	13.7	20.2	3.2	18.1	20.8	0.004846	5.8	1.0	790	162	0.44
Below Devil's Cr	7758.41	2-year	1700	13.2	17.4	2.5		17.7	0.016168	4.3	2.5	393	159	0.48
Below Devil's Cr	7758.41	10-year	2870	13.2	18.6	3.6		19.0	0.012217	4.9	2.8	587	162	0.45
Below Devil's Cr	7758.41	100-year	4480	13.2	20.2	4.6		20.6	0.009042	5.3	2.9	855	181	0.41
Below Devil's Cr	7580.16	2-year	1700	11.6	16.2	2.5		16.5	0.003553	4.7	0.6	363	140	0.51
Below Devil's Cr	7580.16	10-year	2870	11.6	17.7	3.4		18.1	0.002719	4.6	0.6	629	179	0.42
Below Devil's Cr	7580.16	100-year	4480	11.6	19.5	4.8		19.9	0.002216	4.9	0.8	963	196	0.37
Below Devil's Cr	7352.89	2-year	1700	9.5	15.4	2.9		15.8	0.002768	5.7	0.9	417	138	0.45
Below Devil's Cr	7352.89	10-year	2870	9.5	17.0	4.3		17.5	0.002392	6.3	1.0	644	143	0.44
Below Devil's Cr	7352.89	100-year	4480	9.5	18.8	5.5		19.4	0.002226	7.2	1.2	909	158	0.44
Below Devil's Cr	7212.54	2-year	1700	9.9	15.3	3.9		15.4	0.001826	3.1	0.5	551	137	0.27
Below Devil's Cr	7212.54	10-year	2870	9.9	16.9	5.3		17.1	0.001766	3.8	0.6	780	142	0.28
Below Devil's Cr	7212.54	100-year	4480	9.9	18.7	6.3		19.0	0.001780	4.6	0.8	1046	160	0.29
Below Devil's Cr	7125.28	2-year	1700	9.1	15.0	3.4		15.2	0.004993	3.6	1.3	494	140	0.30
Below Devil's Cr	7125.28	10-year	2870	9.1	16.6	4.3		16.9	0.004466	4.2	1.6	755	171	0.30
Below Devil's Cr	7125.28	100-year	4480	9.1	18.5	4.4		18.8	0.003975	4.7	1.9	1150	256	0.30
Below Devil's Cr	7041.79	2-year	1700	7.6	14.5	3.4		14.8	0.003419	4.4	0.9	420	120	0.37
Below Devil's Cr	7041.79	10-year	2870	7.6	16.1	4.5		16.6	0.003282	5.3	1.2	624	132	0.38
Below Devil's Cr	7041.79	100-year	4480	7.6	17.9	3.6		18.5	0.003316	6.3	1.6	880	235	0.40
Below Devil's Cr	6924.16	2-year	1700	7.4	14.3	4.6		14.5	0.001964	3.8	0.6	447	95	0.31
Below Devil's Cr	6924.16	10-year	2870	7.4	15.9	5.8		16.2	0.002183	4.9	0.9	601	99	0.34
Below Devil's Cr	6924.16	100-year	4480	7.4	17.6	6.9		18.1	0.002446	6.0	1.2	774	106	0.37

EXISTING CONDITIONS MLLW

Project: Buskin River

Plan: Buskin Existing MLLW Revised

Geometry: Existing Conditions - MLLW Revised

HEC-RAS Plan: ExistMLLWRev River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	6703.48	2-year	1700	8.0	13.4	3.6		13.9	0.003722	5.7	0.9	303	81	0.50
Below Devil's Cr	6703.48	10-year	2870	8.0	14.8	4.2		15.6	0.003955	7.2	1.3	423	98	0.54
Below Devil's Cr	6703.48	100-year	4480	8.0	16.3	3.6		17.4	0.004042	8.5	1.7	653	178	0.57
Below Devil's Cr	6511.82	2-year	1700	7.8	12.9	4.0		13.3	0.002544	4.9	0.7	350	85	0.41
Below Devil's Cr	6511.82	10-year	2870	7.8	14.3	5.1		14.9	0.002891	6.2	1.0	468	88	0.46
Below Devil's Cr	6511.82	100-year	4480	7.8	15.8	2.9		16.6	0.003073	7.5	1.3	727	245	0.50
Below Devil's Cr	6358.15	2-year	1700	7.5	12.6	4.1		10.3	0.002534	4.2	0.7	406	96	0.35
Below Devil's Cr	6358.15	10-year	2870	7.5	13.9	4.4		11.3	0.002985	5.5	1.1	549	146	0.40
Below Devil's Cr	6358.15	100-year	4480	7.5	15.5	3.4		12.4	0.003080	6.5	1.4	864	284	0.42
Below Devil's Cr	6254.87	2-year	1700	7.0	12.0	3.0		10.5	0.009274	4.7	1.8	367	117	0.45
Below Devil's Cr	6254.87	10-year	2870	7.0	13.4	4.1		11.5	0.008179	5.5	2.3	532	182	0.45
Below Devil's Cr	6254.87	100-year	4480	7.0	15.1	3.4		12.5	0.006095	5.9	2.3	959	368	0.41
Below Devil's Cr	6079.51	2-year	1700	7.0	11.8	3.0		11.9	0.001167	2.3	0.2	753	249	0.23
Below Devil's Cr	6079.51	10-year	2870	7.0	13.3	4.2		13.4	0.000983	2.6	0.3	1146	269	0.21
Below Devil's Cr	6079.51	100-year	4480	7.0	15.1	5.8		15.2	0.000842	2.9	0.3	1633	276	0.20
Below Devil's Cr	5858.48	2-year	1700	7.0	11.4	2.7		9.4	0.003169	1.9	0.5	920	337	0.20
Below Devil's Cr	5858.48	10-year	2870	7.0	13.0	4.2		10.0	0.001906	2.0	0.5	1473	342	0.16
Below Devil's Cr	5858.48	100-year	4480	7.0	14.9	5.9		10.4	0.001417	2.1	0.6	2113	350	0.15
Below Devil's Cr	5768	2-year	1700	5.2	11.4	4.4		11.4	0.000202	1.4	0.1	1269	284	0.11
Below Devil's Cr	5768	10-year	2870	5.2	13.0	5.9		13.0	0.000217	1.7	0.1	1733	288	0.12
Below Devil's Cr	5768	100-year	4480	5.2	14.8	7.6		14.9	0.000226	2.0	0.1	2269	292	0.13
Below Devil's Cr	5681.59	2-year	1700	5.2	11.3	4.1		11.4	0.001624	2.5	0.4	682	160	0.21
Below Devil's Cr	5681.59	10-year	2870	5.2	12.8	5.4		13.0	0.001641	3.1	0.6	940	167	0.22
Below Devil's Cr	5681.59	100-year	4480	5.2	14.6	6.7		14.8	0.001638	3.7	0.8	1254	181	0.23
Below Devil's Cr	5471.28	2-year	1700	4.6	10.8	4.6		11.0	0.001222	4.0	0.4	469	101	0.30
Below Devil's Cr	5471.28	10-year	2870	4.6	12.2	5.4		12.6	0.001612	5.4	0.7	614	111	0.36
Below Devil's Cr	5471.28	100-year	4480	4.6	13.8	6.4		14.4	0.001926	6.7	1.0	797	122	0.41
Below Devil's Cr	5324.83	2-year	1700	2.1	10.8	3.2		10.9	0.000537	2.5	0.2	866	264	0.20
Below Devil's Cr	5324.83	10-year	2870	2.1	12.3	3.8		12.4	0.000565	3.1	0.2	1321	344	0.21
Below Devil's Cr	5324.83	100-year	4480	2.1	14.0	4.8		14.1	0.000527	3.5	0.3	1981	406	0.21
Below Devil's Cr	5234.21	2-year	1700	4.3	10.8	3.1		10.8	0.000498	2.4	0.2	977	317	0.19
Below Devil's Cr	5234.21	10-year	2870	4.3	12.2	3.8		12.3	0.000523	2.9	0.2	1486	389	0.20

EXISTING CONDITIONS MLLW

Project: Buskin River

Plan: Buskin Existing MLLW Revised

Geometry: Existing Conditions - MLLW Revised

HEC-RAS Plan: ExistMLLWRev River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	5234.21	100-year	4480	4.3	14.0	4.7		14.1	0.000502	3.4	0.3	2233	470	0.21
Below Devil's Cr	5003.97	2-year	1700	2.8	10.5	4.1		10.6	0.002868	3.0	0.8	580	139	0.25
Below Devil's Cr	5003.97	10-year	2870	2.8	11.9	5.0		12.1	0.003263	3.8	1.2	786	156	0.28
Below Devil's Cr	5003.97	100-year	4480	2.8	13.5	5.7		13.8	0.003385	4.6	1.6	1066	185	0.29
Below Devil's Cr	4779.81	2-year	1700	4.7	9.5	2.8		9.7	0.006962	3.2	1.3	535	187	0.33
Below Devil's Cr	4779.81	10-year	2870	4.7	11.0	4.2		11.2	0.004787	3.5	1.3	828	197	0.29
Below Devil's Cr	4779.81	100-year	4480	4.7	12.8	5.7		13.0	0.003733	3.9	1.4	1186	207	0.28
Below Devil's Cr	4655.57	2-year	1700	2.6	8.9	3.2		9.2	0.002237	4.1	0.5	415	128	0.40
Below Devil's Cr	4655.57	10-year	2870	2.6	10.4	4.5		10.8	0.002414	4.7	0.7	613	135	0.38
Below Devil's Cr	4655.57	100-year	4480	2.6	12.2	5.8		12.6	0.002449	5.4	1.0	857	144	0.37
Below Devil's Cr	4495.71	2-year	1700	1.1	8.3	4.3		8.7	0.003015	5.4	0.8	317	72	0.45
Below Devil's Cr	4495.71	10-year	2870	1.1	9.3	5.1		10.1	0.004488	7.3	1.4	391	74	0.56
Below Devil's Cr	4495.71	100-year	4480	1.1	10.3	5.8		11.7	0.006288	9.5	2.3	470	77	0.68
Below Devil's Cr	4415.33	2-year	1700	2.8	8.2	2.3	7.0	8.4	0.001831	3.0	0.3	563	247	0.35
Below Devil's Cr	4415.33	10-year	2870	2.8	9.4	3.4	7.6	9.6	0.001312	3.3	0.3	865	314	0.32
Below Devil's Cr	4415.33	100-year	4480	2.8	10.8	2.9	8.1	11.0	0.001077	3.7	0.3	1264	524	0.30
Below Devil's Cr	4187.74	2-year	1700	3.3	7.8	1.7	6.2	8.0	0.001401	3.3	0.2	514	299	0.45
Below Devil's Cr	4187.74	10-year	2870	3.3	9.2	2.5	7.0	9.4	0.000826	2.7	0.1	1049	415	0.30
Below Devil's Cr	4187.74	100-year	4480	3.3	10.7	2.6	8.1	10.8	0.000569	2.7	0.1	1779	684	0.24
Below Devil's Cr	4050.14	2-year	1700	2.8	7.7	1.5	6.3	7.8	0.001360	2.8	0.1	609	411	0.40
Below Devil's Cr	4050.14	10-year	2870	2.8	9.2	2.7	7.3	9.3	0.000639	2.3	0.1	1249	524	0.24
Below Devil's Cr	4050.14	100-year	4480	2.8	10.6	3.0	7.8	10.7	0.000402	2.2	0.1	2199	728	0.19
Below Devil's Cr	3923.07	2-year	1700	1.7	7.7	2.6	5.1	7.7	0.000209	1.4	0.0	1218	471	0.15
Below Devil's Cr	3923.07	10-year	2870	1.7	9.2	3.4	5.6	9.2	0.000158	1.4	0.0	1992	644	0.14
Below Devil's Cr	3923.07	100-year	4480	1.7	10.6	3.8	6.2	10.7	0.000132	1.5	0.0	3092	804	0.12
Below Devil's Cr	3754.68	2-year	1700	3.7	7.7	2.9	5.0	7.7	0.000056	0.7	0.0	2366	812	0.07
Below Devil's Cr	3754.68	10-year	2870	3.7	9.2	3.6	5.3	9.2	0.000044	0.8	0.0	3636	1005	0.07
Below Devil's Cr	3754.68	100-year	4480	3.7	10.6	5.0	5.6	10.6	0.000039	0.9	0.0	5114	1023	0.07
Below Devil's Cr	3695.3	2-year	1700	0.6	7.7	2.6	5.2	7.7	0.000160	1.1	0.0	1521	592	0.12
Below Devil's Cr	3695.3	10-year	2870	0.6	9.2	3.7	5.7	9.2	0.000110	1.2	0.0	2441	773	0.11
Below Devil's Cr	3695.3	100-year	4480	0.6	10.6	4.3	6.1	10.6	0.000088	1.3	0.0	3750	859	0.10

EXISTING CONDITIONS MLLW

Project: Buskin River

Plan: Buskin Existing MLLW Revised

Geometry: Existing Conditions - MLLW Revised

HEC-RAS Plan: ExistMLLWRev River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	3567.52	2-year	1700	2.8	7.6	2.4	5.7	7.7	0.000294	1.5	0.1	1136	474	0.17
Below Devil's Cr	3567.52	10-year	2870	2.8	9.1	3.0	6.1	9.2	0.000173	1.5	0.0	1994	659	0.14
Below Devil's Cr	3567.52	100-year	4480	2.8	10.6	4.2	6.5	10.6	0.000136	1.6	0.0	2991	711	0.13
Below Devil's Cr	3383.39	2-year	1700	2.6	7.5	2.3	5.3	7.6	0.000509	2.3	0.1	733	344	0.27
Below Devil's Cr	3383.39	10-year	2870	2.6	9.0	3.6	5.9	9.1	0.000377	2.3	0.1	1227	534	0.22
Below Devil's Cr	3383.39	100-year	4480	2.6	10.5	3.9	6.5	10.6	0.000255	2.0	0.1	2285	589	0.17
Below Devil's Cr	3162.69	2-year	1700	-0.5	7.4	4.2	3.8	7.5	0.000317	2.2	0.1	767	179	0.19
Below Devil's Cr	3162.69	10-year	2870	-0.5	8.9	2.9	4.9	9.0	0.000340	2.6	0.1	1119	386	0.27
Below Devil's Cr	3162.69	100-year	4480	-0.5	10.4	4.1	5.7	10.5	0.000327	2.6	0.1	1725	418	0.23
Below Devil's Cr	3057.93	2-year	1700	0.6	7.2	4.5	3.9	7.4	0.000873	3.8	0.3	452	98	0.31
Below Devil's Cr	3057.93	10-year	2870	0.6	8.6	2.7	5.1	8.9	0.001064	4.4	0.2	653	237	0.47
Below Devil's Cr	3057.93	100-year	4480	0.6	10.1	3.9	6.4	10.4	0.001013	4.3	0.3	1035	261	0.38
Below Devil's Cr	2853.12	2-year	1700	1.5	7.0	3.7	4.7	7.2	0.001264	4.0	0.3	428	113	0.36
Below Devil's Cr	2853.12	10-year	2870	1.5	8.3	4.6	5.7	8.7	0.001456	4.9	0.4	590	128	0.40
Below Devil's Cr	2853.12	100-year	4480	1.5	9.6	5.3	6.8	10.1	0.001735	5.9	0.6	766	144	0.45
Below Devil's Cr	2680.35	2-year	1700	0.9	6.8	4.1	4.2	7.0	0.001109	4.0	0.3	427	102	0.34
Below Devil's Cr	2680.35	10-year	2870	0.9	8.0	4.9	5.3	8.4	0.001466	5.1	0.5	562	114	0.41
Below Devil's Cr	2680.35	100-year	4480	0.9	9.2	5.5	6.5	9.8	0.001971	6.4	0.7	700	126	0.48
Below Devil's Cr	2555.61	2-year	1700	-0.3	6.4	3.8	4.5	6.8	0.002200	5.3	0.5	319	82	0.48
Below Devil's Cr	2555.61	10-year	2870	-0.3	7.4	4.3	5.7	8.1	0.003192	7.1	0.9	406	94	0.59
Below Devil's Cr	2555.61	100-year	4480	-0.3	7.5	4.3	7.1	9.3	0.006904	10.6	2.0	422	96	0.87
Below Devil's Cr	2432.76	2-year	1700	1.1	6.5	3.7	3.8	6.6	0.000637	2.8	0.2	602	160	0.26
Below Devil's Cr	2432.76	10-year	2870	1.1	7.6	4.5	4.6	7.8	0.000832	3.6	0.2	790	176	0.30
Below Devil's Cr	2432.76	100-year	4480	1.1	8.1	4.7	5.5	8.5	0.001492	5.0	0.4	893	190	0.41
Below Devil's Cr	2314	2-year	1700	1.4	6.4	3.2	3.6	6.5	0.000466	2.2	0.1	783	245	0.21
Below Devil's Cr	2314	10-year	2870	1.4	7.6	4.0	4.3	7.7	0.000517	2.7	0.1	1073	265	0.23
Below Devil's Cr	2314	100-year	4480	1.4	8.1	4.4	5.3	8.3	0.000851	3.7	0.2	1228	277	0.31
Below Devil's Cr	2203.73	2-year	1700	1.5	6.4	3.6	3.5	6.4	0.000472	2.4	0.1	716	197	0.22
Below Devil's Cr	2203.73	10-year	2720	1.5	7.5	4.4	4.1	7.6	0.000525	2.9	0.2	947	218	0.24
Below Devil's Cr	2203.73	100-year	3400	1.5	8.1	4.8	4.5	8.3	0.000557	3.2	0.2	1080	231	0.25
Below Devil's Cr	2099.58	2-year	1700	1.5	5.6	2.6	5.0	6.3	0.005566	6.6	0.9	259	99	0.71
Below Devil's Cr	2099.58	10-year	2720	1.5	6.5	3.0	5.9	7.4	0.006155	7.6	1.2	356	117	0.77

EXISTING CONDITIONS MLLW

Project: Buskin River

Plan: Buskin Existing MLLW Revised

Geometry: Existing Conditions - MLLW Revised

HEC-RAS Plan: ExistMLLWRev River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	2099.58	100-year	3400	1.5	7.0	3.1	6.4	8.0	0.006441	8.2	1.3	413	133	0.80
Below Devil's Cr	2000	2-year	1700	0.8	4.4	2.2	4.4	5.5	0.011638	8.3	1.6	204	95	1.00
Below Devil's Cr	2000	10-year	2720	0.8	5.3	2.6	5.3	6.6	0.010904	9.2	1.8	297	114	1.00
Below Devil's Cr	2000	100-year	3400	0.8	5.8	2.8	5.8	7.2	0.010570	9.6	1.9	355	125	1.00
Below Devil's Cr	1350	2-year	1700	0.0	0.8	0.8	0.1	0.8	0.000026	0.2	0.0	7599	9999	0.05
Below Devil's Cr	1350	10-year	2720	0.0	0.8	0.8	0.1	0.8	0.000066	0.4	0.0	7599	9999	0.07
Below Devil's Cr	1350	100-year	3400	0.0	0.8	0.8	0.2	0.8	0.000103	0.5	0.0	7599	9999	0.09

EXISTING CONDITIONS MHHW

Project: Buskin River

Plan: Buskin Exist MHHW Revised

Geometry: Existing Cond - MHHW Revised

HEC-RAS Plan: ExistMHHWRev River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	9512.09	2-year	1700	20.2	25.0	3.8	23.5	25.5	0.007889	6.1	2.0	283	73	0.53
Below Devil's Cr	9512.09	10-year	2870	20.2	26.4	4.8	24.7	27.3	0.007991	7.5	2.7	395	81	0.56
Below Devil's Cr	9512.09	100-year	4480	20.2	28.2	5.8	26.0	29.3	0.007682	8.8	3.4	542	137	0.58
Below Devil's Cr	9394.8	2-year	1700	18.8	24.4	3.0		24.9	0.003597	5.5	0.9	325	107	0.47
Below Devil's Cr	9394.8	10-year	2870	18.8	26.2	2.4		26.6	0.002644	5.9	1.0	711	291	0.43
Below Devil's Cr	9394.8	100-year	4480	18.8	28.3	3.9		28.7	0.001676	5.8	0.8	1414	357	0.36
Below Devil's Cr	9174.42	2-year	1700	17.6	23.8	4.5		24.2	0.002635	4.8	0.8	355	74	0.38
Below Devil's Cr	9174.42	10-year	2870	17.6	25.6	2.9		26.1	0.002640	5.9	1.1	580	194	0.40
Below Devil's Cr	9174.42	100-year	4480	17.6	27.8	4.0		28.3	0.002007	6.2	1.1	1090	269	0.37
Below Devil's Cr	8922.61	2-year	1700	18.9	22.9	3.4		23.3	0.004342	5.1	1.0	336	95	0.47
Below Devil's Cr	8922.61	10-year	2870	18.9	24.9	4.9		25.4	0.002952	5.6	1.0	528	104	0.42
Below Devil's Cr	8922.61	100-year	4480	18.9	27.2	6.7		27.8	0.002204	6.1	1.1	780	112	0.38
Below Devil's Cr	8803.77	2-year	1700	17.0	22.2	4.0		22.7	0.006663	5.5	1.7	309	75	0.47
Below Devil's Cr	8803.77	10-year	2870	17.0	24.3	5.4		24.9	0.005107	6.3	2.0	471	84	0.44
Below Devil's Cr	8803.77	100-year	4480	17.0	26.7	6.9		27.4	0.004227	7.1	2.2	682	94	0.42
Below Devil's Cr	8704.17	2-year	1700	14.0	21.2	4.6		22.0	0.006849	7.0	2.0	244	47	0.54
Below Devil's Cr	8704.17	10-year	2870	14.0	23.1	5.7		24.2	0.007265	8.7	2.9	334	52	0.58
Below Devil's Cr	8704.17	100-year	4480	14.0	25.0	6.7		26.8	0.007682	10.6	3.9	442	58	0.62
Below Devil's Cr	8585.14	2-year	1700	12.9	21.5	4.9		21.6	0.000718	3.2	0.2	542	106	0.24
Below Devil's Cr	8585.14	10-year	2870	12.9	23.5	6.4		23.7	0.000800	3.9	0.4	765	114	0.25
Below Devil's Cr	8585.14	100-year	4480	12.9	25.8	8.0		26.1	0.000856	4.6	0.5	1036	124	0.26
Below Devil's Cr	8470.78	2-year	1700	13.7	21.0	4.7		21.4	0.006088	5.4	2.0	319	65	0.41
Below Devil's Cr	8470.78	10-year	2870	13.7	22.8	5.9		23.5	0.006572	6.8	2.9	442	71	0.44
Below Devil's Cr	8470.78	100-year	4480	13.7	24.8	7.1		25.8	0.006866	8.2	3.8	593	78	0.47
Below Devil's Cr	8357.96	2-year	1700	13.7	19.8	4.4		20.5	0.009431	6.9	2.7	247	53	0.55
Below Devil's Cr	8357.96	10-year	2870	13.7	21.2	5.3		22.5	0.011298	9.0	4.2	325	56	0.63
Below Devil's Cr	8357.96	100-year	4480	13.7	22.7	6.3		24.7	0.013435	11.3	6.1	411	60	0.72
Below Devil's Cr	8109.32	2-year	1700	12.9	18.6	4.3		19.0	0.003866	5.0	1.1	339	77	0.41
Below Devil's Cr	8109.32	10-year	2870	12.9	19.8	5.1		20.5	0.005111	6.7	1.8	433	82	0.50
Below Devil's Cr	8109.32	100-year	4480	12.9	21.1	6.1		22.2	0.006159	8.5	2.6	545	85	0.56
Below Devil's Cr	7912.72	2-year	1700	13.6	18.1	3.4		18.4	0.002592	4.5	0.6	384	111	0.41
Below Devil's Cr	7912.72	10-year	2870	13.6	19.1	4.3		19.7	0.003144	5.9	0.9	507	117	0.47

EXISTING CONDITIONS MHHW

Project: Buskin River

Plan: Buskin Exist MHHW Revised

Geometry: Existing Cond - MHHW Revised

HEC-RAS Plan: ExistMHHWRev River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	7912.72	100-year	4480	13.6	20.5	5.2	21.3	0.003284	7.1	1.3	673	127	0.50	
Below Devil's Cr	7815.58	2-year	1700	14.1	17.8	2.6	18.1	0.003672	4.2	0.6	401	155	0.46	
Below Devil's Cr	7815.58	10-year	2870	14.1	18.9	3.6	19.3	0.003053	4.9	0.7	583	158	0.45	
Below Devil's Cr	7815.58	100-year	4480	14.1	20.4	5.0	20.9	0.002401	5.5	0.8	825	163	0.42	
Below Devil's Cr	7803.23	2-year	1700	13.7	17.7	2.1	16.6	0.004906	4.2	0.6	403	151	0.45	
Below Devil's Cr	7803.23	10-year	2870	13.7	18.9	2.7	17.3	0.004789	5.0	0.8	579	154	0.45	
Below Devil's Cr	7803.23	100-year	4480	13.7	20.4	3.2	18.1	0.004472	5.6	0.9	814	164	0.43	
Below Devil's Cr	7778.53	2-year	1700	13.7	17.6	2.0	16.6	0.006050	4.5	0.7	376	150	0.50	
Below Devil's Cr	7778.53	10-year	2870	13.7	18.7	2.6	17.3	0.005464	5.2	0.9	553	153	0.48	
Below Devil's Cr	7778.53	100-year	4480	13.7	20.2	3.2	18.1	0.004847	5.8	1.0	790	162	0.44	
Below Devil's Cr	7758.41	2-year	1700	13.2	17.4	2.5		17.7	0.016170	4.3	2.5	393	159	0.48
Below Devil's Cr	7758.41	10-year	2870	13.2	18.6	3.6		19.0	0.012206	4.9	2.8	587	162	0.45
Below Devil's Cr	7758.41	100-year	4480	13.2	20.2	4.6		20.6	0.009042	5.3	2.9	855	181	0.41
Below Devil's Cr	7580.16	2-year	1700	11.6	16.2	2.5		16.5	0.003546	4.7	0.6	363	140	0.51
Below Devil's Cr	7580.16	10-year	2870	11.6	17.7	3.4		18.1	0.002714	4.6	0.6	630	179	0.42
Below Devil's Cr	7580.16	100-year	4480	11.6	19.5	4.8		19.9	0.002216	4.9	0.8	963	196	0.37
Below Devil's Cr	7352.89	2-year	1700	9.5	15.4	2.9		15.8	0.002756	5.6	0.9	418	138	0.45
Below Devil's Cr	7352.89	10-year	2870	9.5	17.0	4.4		17.5	0.002386	6.3	1.0	644	143	0.43
Below Devil's Cr	7352.89	100-year	4480	9.5	18.8	5.5		19.4	0.002226	7.2	1.2	909	158	0.44
Below Devil's Cr	7212.54	2-year	1700	9.9	15.3	3.9		15.4	0.001817	3.1	0.5	552	137	0.27
Below Devil's Cr	7212.54	10-year	2870	9.9	16.9	5.3		17.1	0.001761	3.8	0.6	781	142	0.28
Below Devil's Cr	7212.54	100-year	4480	9.9	18.7	6.3		19.0	0.001781	4.6	0.8	1046	160	0.29
Below Devil's Cr	7125.28	2-year	1700	9.1	15.0	3.4		15.2	0.004964	3.6	1.3	495	140	0.30
Below Devil's Cr	7125.28	10-year	2870	9.1	16.6	4.3		16.9	0.004450	4.2	1.6	756	171	0.30
Below Devil's Cr	7125.28	100-year	4480	9.1	18.5	4.4		18.8	0.003975	4.7	1.9	1150	256	0.30
Below Devil's Cr	7041.79	2-year	1700	7.6	14.5	3.4		14.8	0.003390	4.4	0.9	421	121	0.37
Below Devil's Cr	7041.79	10-year	2870	7.6	16.1	4.6		16.6	0.003267	5.3	1.2	625	132	0.38
Below Devil's Cr	7041.79	100-year	4480	7.6	17.9	3.6		18.5	0.003316	6.3	1.6	880	235	0.40
Below Devil's Cr	6924.16	2-year	1700	7.4	14.3	4.6		14.5	0.001947	3.8	0.6	448	95	0.30
Below Devil's Cr	6924.16	10-year	2870	7.4	15.9	5.8		16.2	0.002173	4.9	0.9	602	99	0.34
Below Devil's Cr	6924.16	100-year	4480	7.4	17.6	6.9		18.1	0.002447	6.0	1.2	774	106	0.37

Steady Flow: Buskin MHHW

Run as subcritical, MHHW boundary condition

HEC-RAS 3.1.3 run 1-26-09

EXISTING CONDITIONS MHHW

Project: Buskin River

Plan: Buskin Exist MHHW Revised

Geometry: Existing Cond - MHHW Revised

HEC-RAS Plan: ExistMHHWRev River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	6703.48	2-year	1700	8.0	13.4	3.7		13.9	0.003637	5.7	0.9	305	82	0.49
Below Devil's Cr	6703.48	10-year	2870	8.0	14.8	4.2		15.6	0.003909	7.1	1.3	425	98	0.54
Below Devil's Cr	6703.48	100-year	4480	8.0	16.3	3.6		17.4	0.004044	8.5	1.7	653	178	0.57
Below Devil's Cr	6511.82	2-year	1700	7.8	12.9	4.0		13.3	0.002455	4.8	0.7	354	85	0.41
Below Devil's Cr	6511.82	10-year	2870	7.8	14.3	5.1		14.9	0.002842	6.2	1.0	471	88	0.46
Below Devil's Cr	6511.82	100-year	4480	7.8	15.8	2.9		16.6	0.003075	7.5	1.3	726	245	0.50
Below Devil's Cr	6358.15	2-year	1700	7.5	12.6	4.2	10.3	12.9	0.002423	4.2	0.7	412	96	0.35
Below Devil's Cr	6358.15	10-year	2870	7.5	13.9	4.4	11.3	14.4	0.002920	5.4	1.0	554	148	0.40
Below Devil's Cr	6358.15	100-year	4480	7.5	15.5	3.4	12.4	16.1	0.003083	6.5	1.4	864	284	0.42
Below Devil's Cr	6254.87	2-year	1700	7.0	12.1	3.1	10.5	12.5	0.008351	4.5	1.7	379	117	0.43
Below Devil's Cr	6254.87	10-year	2870	7.0	13.5	4.1	11.5	13.9	0.007846	5.5	2.2	539	186	0.44
Below Devil's Cr	6254.87	100-year	4480	7.0	15.1	3.4	12.5	15.6	0.006104	5.9	2.3	958	368	0.41
Below Devil's Cr	6079.51	2-year	1700	7.0	11.9	3.1		12.0	0.001013	2.2	0.2	791	252	0.21
Below Devil's Cr	6079.51	10-year	2870	7.0	13.4	4.3		13.5	0.000939	2.6	0.3	1165	270	0.21
Below Devil's Cr	6079.51	100-year	4480	7.0	15.1	5.8		15.2	0.000843	2.9	0.3	1632	276	0.20
Below Devil's Cr	5858.48	2-year	1700	7.0	11.6	2.9	9.4	11.7	0.002457	1.7	0.5	994	338	0.18
Below Devil's Cr	5858.48	10-year	2870	7.0	13.1	4.3	10.0	13.2	0.001790	1.9	0.5	1501	343	0.16
Below Devil's Cr	5858.48	100-year	4480	7.0	14.9	5.9	10.4	14.9	0.001419	2.1	0.6	2112	350	0.15
Below Devil's Cr	5768	2-year	1700	5.2	11.6	4.6		11.6	0.000173	1.3	0.1	1332	284	0.10
Below Devil's Cr	5768	10-year	2870	5.2	13.1	6.0		13.1	0.000207	1.7	0.1	1757	288	0.12
Below Devil's Cr	5768	100-year	4480	5.2	14.8	7.6		14.9	0.000226	2.0	0.1	2268	292	0.13
Below Devil's Cr	5681.59	2-year	1700	5.2	11.5	4.3		11.6	0.001363	2.4	0.4	720	161	0.20
Below Devil's Cr	5681.59	10-year	2870	5.2	12.9	5.5		13.1	0.001561	3.0	0.6	955	168	0.22
Below Devil's Cr	5681.59	100-year	4480	5.2	14.6	6.7		14.8	0.001640	3.7	0.8	1253	181	0.23
Below Devil's Cr	5471.28	2-year	1700	4.6	11.1	4.8		11.3	0.001017	3.8	0.4	500	102	0.28
Below Devil's Cr	5471.28	10-year	2870	4.6	12.3	5.5		12.7	0.001518	5.3	0.7	628	112	0.35
Below Devil's Cr	5471.28	100-year	4480	4.6	13.8	6.4		14.4	0.001929	6.7	1.0	796	122	0.41
Below Devil's Cr	5324.83	2-year	1700	2.1	11.1	3.3		11.2	0.000425	2.3	0.1	952	288	0.18
Below Devil's Cr	5324.83	10-year	2870	2.1	12.4	3.8		12.5	0.000524	3.0	0.2	1363	349	0.20
Below Devil's Cr	5324.83	100-year	4480	2.1	14.0	4.8		14.1	0.000528	3.5	0.3	1980	406	0.21
Below Devil's Cr	5234.21	2-year	1700	4.3	11.1	3.3		11.1	0.000389	2.2	0.1	1082	325	0.17
Below Devil's Cr	5234.21	10-year	2870	4.3	12.4	3.9		12.5	0.000486	2.9	0.2	1535	397	0.20

EXISTING CONDITIONS MHHW

Project: Buskin River

Plan: Buskin Exist MHHW Revised

Geometry: Existing Cond - MHHW Revised

HEC-RAS Plan: ExistMHHWRev River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	5234.21	100-year	4480	4.3	13.9	4.7	14.1	0.000503	3.4	0.3	2231	470	0.21	
Below Devil's Cr	5003.97	2-year	1700	2.8	10.9	4.4	11.0	0.002178	2.7	0.7	634	143	0.22	
Below Devil's Cr	5003.97	10-year	2870	2.8	12.0	5.0	12.2	0.002997	3.7	1.1	809	158	0.26	
Below Devil's Cr	5003.97	100-year	4480	2.8	13.5	5.7	13.8	0.003392	4.6	1.6	1065	185	0.29	
Below Devil's Cr	4779.81	2-year	1700	4.7	10.3	3.5	10.4	0.003069	2.5	0.7	687	192	0.23	
Below Devil's Cr	4779.81	10-year	2870	4.7	11.3	4.4	11.5	0.003925	3.3	1.1	881	198	0.27	
Below Devil's Cr	4779.81	100-year	4480	4.7	12.8	5.6	13.0	0.003748	3.9	1.4	1184	207	0.28	
Below Devil's Cr	4655.57	2-year	1700	2.6	10.0	4.1	10.2	0.001075	3.1	0.3	559	133	0.26	
Below Devil's Cr	4655.57	10-year	2870	2.6	10.8	4.8	11.1	0.001963	4.4	0.6	664	137	0.34	
Below Devil's Cr	4655.57	100-year	4480	2.6	12.2	5.8	12.6	0.002459	5.4	1.0	856	144	0.37	
Below Devil's Cr	4495.71	2-year	1700	1.1	9.7	5.4	10.0	0.001249	4.0	0.4	422	75	0.30	
Below Devil's Cr	4495.71	10-year	2870	1.1	10.0	5.5	10.6	0.003132	6.5	1.1	441	76	0.48	
Below Devil's Cr	4495.71	100-year	4480	1.1	10.3	5.8	11.7	0.006392	9.6	2.3	468	77	0.68	
Below Devil's Cr	4415.33	2-year	1700	2.8	9.8	3.7	7.0	9.8	0.000345	1.8	0.1	946	324	0.17
Below Devil's Cr	4415.33	10-year	2870	2.8	10.1	3.8	7.6	10.2	0.000743	2.8	0.2	1039	350	0.24
Below Devil's Cr	4415.33	100-year	4480	2.8	10.7	2.9	8.1	10.9	0.001103	3.7	0.3	1251	517	0.31
Below Devil's Cr	4187.74	2-year	1700	3.3	9.7	2.9	6.2	9.7	0.000186	1.4	0.0	1250	437	0.14
Below Devil's Cr	4187.74	10-year	2870	3.3	10.0	3.0	7.0	10.1	0.000401	2.1	0.1	1390	499	0.20
Below Devil's Cr	4187.74	100-year	4480	3.3	10.6	2.6	8.1	10.7	0.000586	2.7	0.1	1755	684	0.24
Below Devil's Cr	4050.14	2-year	1700	2.8	9.7	3.2	6.3	9.7	0.000136	1.1	0.0	1492	614	0.11
Below Devil's Cr	4050.14	10-year	2870	2.8	10.0	3.0	7.3	10.0	0.000288	1.7	0.1	1723	664	0.16
Below Devil's Cr	4050.14	100-year	4480	2.8	10.6	3.0	7.8	10.7	0.000415	2.2	0.1	2172	723	0.20
Below Devil's Cr	3923.07	2-year	1700	1.7	9.7	3.2	5.1	9.7	0.000037	0.7	0.0	2389	751	0.07
Below Devil's Cr	3923.07	10-year	2870	1.7	10.0	3.4	5.6	10.0	0.000083	1.1	0.0	2611	761	0.10
Below Devil's Cr	3923.07	100-year	4480	1.7	10.6	3.9	6.2	10.6	0.000135	1.6	0.0	3063	793	0.13
Below Devil's Cr	3754.68	2-year	1700	3.7	9.7	4.1	5.0	9.7	0.000010	0.4	0.0	4174	1016	0.04
Below Devil's Cr	3754.68	10-year	2870	3.7	10.0	4.4	5.3	10.0	0.000024	0.6	0.0	4475	1018	0.05
Below Devil's Cr	3754.68	100-year	4480	3.7	10.6	5.0	5.6	10.6	0.000040	0.9	0.0	5076	1023	0.07
Below Devil's Cr	3695.3	2-year	1700	0.6	9.7	3.6	5.2	9.7	0.000024	0.6	0.0	2987	822	0.05
Below Devil's Cr	3695.3	10-year	2870	0.6	10.0	3.9	5.7	10.0	0.000056	0.9	0.0	3227	832	0.08
Below Devil's Cr	3695.3	100-year	4480	0.6	10.6	4.3	6.1	10.6	0.000090	1.3	0.0	3718	858	0.10

Steady Flow: Buskin MHHW

Run as subcritical, MHHW boundary condition

HEC-RAS 3.1.3 run 1-26-09

EXISTING CONDITIONS MHHW

Project: Buskin River

Plan: Buskin Exist MHHW Revised

Geometry: Existing Cond - MHHW Revised

HEC-RAS Plan: ExistMHHWRev River: Buskin Reach: Below Devil's Cr

Reach River Sta Profile Q Total Min Ch El W.S. Elev

(cfs) (ft) (ft)

Below Devil's Cr 3567.52 2-year 1700 2.8 9.7

Below Devil's Cr 3567.52 10-year 2870 2.8 10.0

Below Devil's Cr 3567.52 100-year 4480 2.8 10.5

Below Devil's Cr 3383.39 2-year 1700 2.6 9.7

Below Devil's Cr 3383.39 10-year 2870 2.6 9.9

Below Devil's Cr 3383.39 100-year 4480 2.6 10.5

Below Devil's Cr 3162.69 2-year 1700 -0.5 9.6

Below Devil's Cr 3162.69 10-year 2870 -0.5 9.9

Below Devil's Cr 3162.69 100-year 4480 -0.5 10.4

Below Devil's Cr 3057.93 2-year 1700 0.6 9.6

Below Devil's Cr 3057.93 10-year 2870 0.6 9.7

Below Devil's Cr 3057.93 100-year 4480 0.6 10.1

Below Devil's Cr 2853.12 2-year 1700 1.5 9.5

Below Devil's Cr 2853.12 10-year 2870 1.5 9.5

Below Devil's Cr 2853.12 100-year 4480 1.5 9.6

Below Devil's Cr 2680.35 2-year 1700 0.9 9.5

Below Devil's Cr 2680.35 10-year 2870 0.9 9.4

Below Devil's Cr 2680.35 100-year 4480 0.9 9.1

Below Devil's Cr 2555.61 2-year 1700 -0.3 9.5

Below Devil's Cr 2555.61 10-year 2870 -0.3 9.5

Below Devil's Cr 2555.61 100-year 4480 -0.3 9.5

Steady Flow: Buskin MHHW

Run as subcritical, MHHW boundary condition

HEC-RAS 3.1.3 run 1-26-09

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Hydr Radius	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Shear Chan	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(lb/sq ft)	(sq ft)	(ft)	
Below Devil's Cr	3567.52	2-year	1700	2.8	9.7	3.5	5.7	9.7	0.000038	0.8	0.0	2374	677	0.07
Below Devil's Cr	3567.52	10-year	2870	2.8	10.0	3.7	6.1	10.0	0.000086	1.2	0.0	2565	686	0.10
Below Devil's Cr	3567.52	100-year	4480	2.8	10.5	4.2	6.5	10.6	0.000139	1.6	0.0	2964	711	0.13
Below Devil's Cr	3383.39	2-year	1700	2.6	9.7	4.1	5.3	9.7	0.000083	1.2	0.0	1449	562	0.10
Below Devil's Cr	3383.39	10-year	2870	2.6	9.9	4.3	5.9	10.0	0.000200	1.9	0.1	1535	567	0.16
Below Devil's Cr	3383.39	100-year	4480	2.6	10.5	3.8	6.5	10.5	0.000262	2.0	0.1	2262	588	0.18
Below Devil's Cr	3162.69	2-year	1700	-0.5	9.6	3.4	3.8	9.7	0.000075	1.2	0.0	1410	410	0.12
Below Devil's Cr	3162.69	10-year	2870	-0.5	9.9	3.6	4.9	9.9	0.000186	1.9	0.0	1500	413	0.18
Below Devil's Cr	3162.69	100-year	4480	-0.5	10.4	4.1	5.7	10.5	0.000335	2.6	0.1	1708	418	0.23
Below Devil's Cr	3057.93	2-year	1700	0.6	9.6	3.4	3.9	9.7	0.000204	1.9	0.0	893	257	0.18
Below Devil's Cr	3057.93	10-year	2870	0.6	9.7	3.6	5.1	9.9	0.000534	3.1	0.1	928	258	0.29
Below Devil's Cr	3057.93	100-year	4480	0.6	10.1	3.9	6.4	10.4	0.001043	4.4	0.3	1023	261	0.39
Below Devil's Cr	2853.12	2-year	1700	1.5	9.5	5.2	4.7	9.6	0.000261	2.3	0.1	753	143	0.17
Below Devil's Cr	2853.12	10-year	2870	1.5	9.5	5.2	5.7	9.7	0.000747	3.8	0.2	752	143	0.29
Below Devil's Cr	2853.12	100-year	4480	1.5	9.6	5.2	6.8	10.1	0.001791	5.9	0.6	757	143	0.45
Below Devil's Cr	2680.35	2-year	1700	0.9	9.5	5.6	4.2	9.6	0.000246	2.3	0.1	738	129	0.17
Below Devil's Cr	2680.35	10-year	2870	0.9	9.4	5.6	5.3	9.6	0.000738	4.0	0.3	724	128	0.29
Below Devil's Cr	2680.35	100-year	4480	0.9	9.1	5.4	6.5	9.8	0.002052	6.5	0.7	689	125	0.49
Below Devil's Cr	2555.61	2-year	1700	-0.3	9.5	6.0	2.6	9.5	0.000005	0.4	0.0	4380	717	0.02
Below Devil's Cr	2555.61	10-year	2870	-0.3	9.5	6.0	3.1	9.5	0.000013	0.6	0.0	4380	717	0.04
Below Devil's Cr	2555.61	100-year	4480	-0.3	9.5	6.0	3.5	9.6	0.000033	0.9	0.0	4380	717	0.06

APPENDIX E

Tabular Proposed Conditions Model Output

PROPOSED CONDITIONS MLLW

Project: Buskin River

Plan: Buskin Proposed MLLW alts 2&3 Rev

Geometry: Proposed Conditions MLLW alts 2&3 Rev

HEC-RAS Plan: PrCd2&3MLLWR River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Hydr Radius	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Shear Chan	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(lb/sq ft)	(sq ft)	(ft)	
Below Devil's Cr	9512.09	2-year	1700	20.2	25.0	3.8	23.5	25.5	0.007889	6.1	2.0	283	73	0.53
Below Devil's Cr	9512.09	10-year	2870	20.2	26.4	4.8	24.7	27.3	0.007991	7.5	2.7	395	81	0.56
Below Devil's Cr	9512.09	100-year	4480	20.2	28.2	5.8	26.0	29.3	0.007682	8.8	3.4	542	137	0.58
Below Devil's Cr	9394.8	2-year	1700	18.8	24.4	3.0		24.9	0.003597	5.5	0.9	325	107	0.47
Below Devil's Cr	9394.8	10-year	2870	18.8	26.2	2.4		26.6	0.002644	5.9	1.0	711	291	0.43
Below Devil's Cr	9394.8	100-year	4480	18.8	28.3	3.9		28.7	0.001676	5.8	0.8	1414	357	0.36
Below Devil's Cr	9174.42	2-year	1700	17.6	23.8	4.5		24.2	0.002635	4.8	0.8	355	74	0.38
Below Devil's Cr	9174.42	10-year	2870	17.6	25.6	2.9		26.1	0.002640	5.9	1.1	580	194	0.40
Below Devil's Cr	9174.42	100-year	4480	17.6	27.8	4.0		28.3	0.002007	6.2	1.1	1090	269	0.37
Below Devil's Cr	8922.61	2-year	1700	18.9	22.9	3.4		23.3	0.004342	5.1	1.0	336	95	0.47
Below Devil's Cr	8922.61	10-year	2870	18.9	24.9	4.9		25.4	0.002952	5.6	1.0	528	104	0.42
Below Devil's Cr	8922.61	100-year	4480	18.9	27.2	6.7		27.8	0.002204	6.1	1.1	780	112	0.38
Below Devil's Cr	8803.77	2-year	1700	17.0	22.2	4.0		22.7	0.006663	5.5	1.7	309	75	0.47
Below Devil's Cr	8803.77	10-year	2870	17.0	24.3	5.4		24.9	0.005107	6.3	2.0	471	84	0.44
Below Devil's Cr	8803.77	100-year	4480	17.0	26.7	6.9		27.4	0.004227	7.1	2.2	682	94	0.42
Below Devil's Cr	8704.17	2-year	1700	14.0	21.2	4.6		22.0	0.006849	7.0	2.0	244	47	0.54
Below Devil's Cr	8704.17	10-year	2870	14.0	23.1	5.7		24.2	0.007265	8.7	2.9	334	52	0.58
Below Devil's Cr	8704.17	100-year	4480	14.0	25.0	6.7		26.8	0.007682	10.6	3.9	442	58	0.62
Below Devil's Cr	8585.14	2-year	1700	12.9	21.5	4.9		21.6	0.000718	3.2	0.2	542	106	0.24
Below Devil's Cr	8585.14	10-year	2870	12.9	23.5	6.4		23.7	0.000800	3.9	0.4	765	114	0.25
Below Devil's Cr	8585.14	100-year	4480	12.9	25.8	8.0		26.1	0.000856	4.6	0.5	1036	124	0.26
Below Devil's Cr	8470.78	2-year	1700	13.7	21.0	4.7		21.4	0.006088	5.4	2.0	319	65	0.41
Below Devil's Cr	8470.78	10-year	2870	13.7	22.8	5.9		23.5	0.006572	6.8	2.9	442	71	0.44
Below Devil's Cr	8470.78	100-year	4480	13.7	24.8	7.1		25.8	0.006866	8.2	3.8	593	78	0.47
Below Devil's Cr	8357.96	2-year	1700	13.7	19.8	4.4		20.5	0.009431	6.9	2.7	247	53	0.55
Below Devil's Cr	8357.96	10-year	2870	13.7	21.2	5.3		22.5	0.011299	9.0	4.2	325	56	0.63
Below Devil's Cr	8357.96	100-year	4480	13.7	22.7	6.3		24.7	0.013435	11.3	6.1	411	60	0.72
Below Devil's Cr	8109.32	2-year	1700	12.9	18.6	4.3		19.0	0.003866	5.0	1.1	339	77	0.41
Below Devil's Cr	8109.32	10-year	2870	12.9	19.8	5.1		20.5	0.005112	6.7	1.8	433	82	0.50
Below Devil's Cr	8109.32	100-year	4480	12.9	21.1	6.1		22.2	0.006159	8.5	2.6	545	85	0.56
Below Devil's Cr	7912.72	2-year	1700	13.6	18.1	3.4		18.4	0.002592	4.5	0.6	384	111	0.41
Below Devil's Cr	7912.72	10-year	2870	13.6	19.1	4.3		19.7	0.003145	5.9	0.9	507	117	0.47

PROPOSED CONDITIONS MLLW

Project: Buskin River

Plan: Buskin Proposed MLLW alts 2&3 Rev

Geometry: Proposed Conditions MLLW alts 2&3 Rev

HEC-RAS Plan: PrCd2&3MLLWR River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	7912.72	100-year	4480	13.6	20.5	5.2		21.3	0.003284	7.1	1.3	674	127	0.50
Below Devil's Cr	7815.58	2-year	1700	14.1	17.8	2.6		18.1	0.003672	4.2	0.6	401	155	0.46
Below Devil's Cr	7815.58	10-year	2870	14.1	18.9	3.6		19.3	0.003055	4.9	0.7	583	158	0.45
Below Devil's Cr	7815.58	100-year	4480	14.1	20.4	5.0		20.9	0.002401	5.5	0.8	825	163	0.42
Below Devil's Cr	7803.23	2-year	1700	13.7	17.7	2.1	16.6	18.0	0.004905	4.2	0.6	403	151	0.45
Below Devil's Cr	7803.23	10-year	2870	13.7	18.9	2.7	17.3	19.3	0.004792	5.0	0.8	578	154	0.45
Below Devil's Cr	7803.23	100-year	4480	13.7	20.4	3.2	18.1	20.9	0.004472	5.6	0.9	814	164	0.43
Below Devil's Cr	7778.53	2-year	1700	13.7	17.6	2.0	16.6	17.9	0.006050	4.5	0.7	376	150	0.50
Below Devil's Cr	7778.53	10-year	2870	13.7	18.7	2.6	17.3	19.1	0.005467	5.2	0.9	553	153	0.48
Below Devil's Cr	7778.53	100-year	4480	13.7	20.2	3.2	18.1	20.8	0.004846	5.8	1.0	790	162	0.44
Below Devil's Cr	7758.41	2-year	1700	13.2	17.4	2.5		17.7	0.016168	4.3	2.5	393	159	0.48
Below Devil's Cr	7758.41	10-year	2870	13.2	18.6	3.6		19.0	0.012217	4.9	2.8	587	162	0.45
Below Devil's Cr	7758.41	100-year	4480	13.2	20.2	4.6		20.6	0.009042	5.3	2.9	855	181	0.41
Below Devil's Cr	7580.16	2-year	1700	11.6	16.2	2.5		16.5	0.003553	4.7	0.6	363	140	0.51
Below Devil's Cr	7580.16	10-year	2870	11.6	17.7	3.4		18.1	0.002719	4.6	0.6	629	179	0.42
Below Devil's Cr	7580.16	100-year	4480	11.6	19.5	4.8		19.9	0.002216	4.9	0.8	964	196	0.37
Below Devil's Cr	7352.89	2-year	1700	9.5	15.4	2.9		15.8	0.002768	5.7	0.9	417	138	0.45
Below Devil's Cr	7352.89	10-year	2870	9.5	17.0	4.3		17.5	0.002392	6.3	1.0	644	143	0.44
Below Devil's Cr	7352.89	100-year	4480	9.5	18.8	5.5		19.4	0.002226	7.2	1.2	909	158	0.44
Below Devil's Cr	7212.54	2-year	1700	9.9	15.3	3.9		15.4	0.001826	3.1	0.5	551	137	0.27
Below Devil's Cr	7212.54	10-year	2870	9.9	16.9	5.3		17.1	0.001766	3.8	0.6	780	142	0.28
Below Devil's Cr	7212.54	100-year	4480	9.9	18.7	6.3		19.0	0.001780	4.6	0.8	1046	160	0.29
Below Devil's Cr	7125.28	2-year	1700	9.1	15.0	3.4		15.2	0.004993	3.6	1.3	494	140	0.30
Below Devil's Cr	7125.28	10-year	2870	9.1	16.6	4.3		16.9	0.004466	4.2	1.6	755	171	0.30
Below Devil's Cr	7125.28	100-year	4480	9.1	18.5	4.4		18.8	0.003975	4.7	1.9	1150	256	0.30
Below Devil's Cr	7041.79	2-year	1700	7.6	14.5	3.4		14.8	0.003419	4.4	0.9	420	120	0.37
Below Devil's Cr	7041.79	10-year	2870	7.6	16.1	4.5		16.6	0.003282	5.3	1.2	624	132	0.38
Below Devil's Cr	7041.79	100-year	4480	7.6	17.9	3.6		18.5	0.003316	6.3	1.6	880	235	0.40
Below Devil's Cr	6924.16	2-year	1700	7.4	14.3	4.6		14.5	0.001964	3.8	0.6	447	95	0.31
Below Devil's Cr	6924.16	10-year	2870	7.4	15.9	5.8		16.2	0.002183	4.9	0.9	601	99	0.34
Below Devil's Cr	6924.16	100-year	4480	7.4	17.6	6.9		18.1	0.002446	6.0	1.2	774	106	0.37

PROPOSED CONDITIONS MLLW

Project: Buskin River

Plan: Buskin Proposed MLLW alts 2&3 Rev

Geometry: Proposed Conditions MLLW alts 2&3 Rev

HEC-RAS Plan: PrCd2&3MLLWR River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	6703.48	2-year	1700	8.0	13.4	3.6		13.9	0.003722	5.7	0.9	303	81	0.50
Below Devil's Cr	6703.48	10-year	2870	8.0	14.8	4.2		15.6	0.003955	7.2	1.3	423	98	0.54
Below Devil's Cr	6703.48	100-year	4480	8.0	16.3	3.6		17.4	0.004042	8.5	1.7	653	178	0.57
Below Devil's Cr	6511.82	2-year	1700	7.8	12.9	4.0		13.3	0.002544	4.9	0.7	350	85	0.41
Below Devil's Cr	6511.82	10-year	2870	7.8	14.3	5.1		14.9	0.002890	6.2	1.0	468	88	0.46
Below Devil's Cr	6511.82	100-year	4480	7.8	15.8	2.9		16.6	0.003072	7.5	1.3	727	245	0.50
Below Devil's Cr	6358.15	2-year	1700	7.5	12.6	4.1	10.3	12.8	0.002534	4.2	0.7	406	96	0.35
Below Devil's Cr	6358.15	10-year	2870	7.5	13.9	4.4	11.3	14.4	0.002985	5.5	1.1	549	146	0.40
Below Devil's Cr	6358.15	100-year	4480	7.5	15.5	3.4	12.4	16.1	0.003080	6.5	1.4	865	284	0.42
Below Devil's Cr	6254.87	2-year	1700	7.0	12.0	3.0	10.5	12.4	0.009274	4.7	1.8	367	117	0.45
Below Devil's Cr	6254.87	10-year	2870	7.0	13.4	4.1	11.5	13.9	0.008177	5.5	2.3	532	182	0.45
Below Devil's Cr	6254.87	100-year	4480	7.0	15.1	3.4	12.5	15.6	0.006094	5.9	2.3	959	368	0.41
Below Devil's Cr	6079.51	2-year	1700	7.0	11.8	3.0		11.9	0.001166	2.3	0.2	753	249	0.23
Below Devil's Cr	6079.51	10-year	2870	7.0	13.3	4.2		13.4	0.000983	2.6	0.3	1147	269	0.21
Below Devil's Cr	6079.51	100-year	4480	7.0	15.1	5.8		15.2	0.000842	2.9	0.3	1633	276	0.20
Below Devil's Cr	5858.48	2-year	1700	7.0	11.4	2.7	9.4	11.5	0.003168	1.9	0.5	920	337	0.20
Below Devil's Cr	5858.48	10-year	2870	7.0	13.0	4.2	10.0	13.1	0.001905	2.0	0.5	1473	342	0.16
Below Devil's Cr	5858.48	100-year	4480	7.0	14.9	5.9	10.4	14.9	0.001417	2.1	0.6	2113	350	0.15
Below Devil's Cr	5768	2-year	1700	5.2	11.4	4.4		11.4	0.000202	1.4	0.1	1269	284	0.11
Below Devil's Cr	5768	10-year	2870	5.2	13.0	5.9		13.0	0.000217	1.7	0.1	1733	288	0.12
Below Devil's Cr	5768	100-year	4480	5.2	14.8	7.6		14.9	0.000226	2.0	0.1	2269	292	0.13
Below Devil's Cr	5681.59	2-year	1700	5.2	11.3	4.1		11.4	0.001624	2.5	0.4	682	160	0.21
Below Devil's Cr	5681.59	10-year	2870	5.2	12.8	5.4		13.0	0.001641	3.1	0.6	940	167	0.22
Below Devil's Cr	5681.59	100-year	4480	5.2	14.6	6.7		14.8	0.001637	3.7	0.8	1254	181	0.23
Below Devil's Cr	5471.28	2-year	1700	4.6	10.8	4.6		11.0	0.001222	4.0	0.4	469	101	0.30
Below Devil's Cr	5471.28	10-year	2870	4.6	12.2	5.4		12.6	0.001611	5.4	0.7	614	111	0.36
Below Devil's Cr	5471.28	100-year	4480	4.6	13.8	6.4		14.4	0.001926	6.7	1.0	797	122	0.41
Below Devil's Cr	5324.83	2-year	1700	2.1	10.8	3.2		10.9	0.000537	2.5	0.2	866	264	0.20
Below Devil's Cr	5324.83	10-year	2870	2.1	12.3	3.8		12.4	0.000565	3.1	0.2	1321	344	0.21
Below Devil's Cr	5324.83	100-year	4480	2.1	14.0	4.8		14.1	0.000527	3.5	0.3	1982	406	0.21
Below Devil's Cr	5234.21	2-year	1700	4.3	10.8	3.1		10.8	0.000498	2.4	0.2	978	317	0.19
Below Devil's Cr	5234.21	10-year	2870	4.3	12.2	3.8		12.3	0.000523	2.9	0.2	1487	389	0.20

PROPOSED CONDITIONS MLLW

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HEC-RAS Plan: PrCd2&3MLLWR River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	5234.21	100-year	4480	4.3	14.0	4.7		14.1	0.000501	3.4	0.3	2233	470	0.21
Below Devil's Cr	5003.97	2-year	1700	2.8	10.5	4.1		10.6	0.002867	3.0	0.8	580	139	0.25
Below Devil's Cr	5003.97	10-year	2870	2.8	11.9	5.0		12.1	0.003261	3.8	1.2	786	156	0.27
Below Devil's Cr	5003.97	100-year	4480	2.8	13.5	5.7		13.8	0.003384	4.6	1.6	1066	185	0.29
Below Devil's Cr	4779.81	2-year	1700	4.7	9.5	2.8		9.7	0.006956	3.2	1.3	535	187	0.33
Below Devil's Cr	4779.81	10-year	2870	4.7	11.0	4.2		11.2	0.004782	3.5	1.3	828	197	0.29
Below Devil's Cr	4779.81	100-year	4480	4.7	12.8	5.7		13.0	0.003731	3.9	1.4	1186	207	0.27
Below Devil's Cr	4655.57	2-year	1700	2.6	8.9	3.2		9.2	0.002235	4.1	0.5	415	128	0.40
Below Devil's Cr	4655.57	10-year	2870	2.6	10.4	4.5		10.8	0.002411	4.7	0.7	614	135	0.38
Below Devil's Cr	4655.57	100-year	4480	2.6	12.2	5.8		12.6	0.002448	5.4	1.0	857	144	0.37
Below Devil's Cr	4495.71	2-year	1700	1.1	8.3	4.3		8.7	0.003011	5.4	0.8	317	72	0.45
Below Devil's Cr	4495.71	10-year	2870	1.1	9.3	5.1		10.1	0.004477	7.3	1.4	391	74	0.56
Below Devil's Cr	4495.71	100-year	4480	1.1	10.3	5.8		11.7	0.006277	9.5	2.3	471	77	0.68
Below Devil's Cr	4415.33	2-year	1700	2.8	8.2	2.3	7.0	8.4	0.001826	3.0	0.3	564	247	0.35
Below Devil's Cr	4415.33	10-year	2870	2.8	9.4	3.4	7.6	9.6	0.001306	3.3	0.3	866	314	0.32
Below Devil's Cr	4415.33	100-year	4480	2.8	10.8	2.9	8.1	11.0	0.001074	3.7	0.3	1266	524	0.30
Below Devil's Cr	4187.74	2-year	1700	3.3	7.8	1.7	6.2	8.0	0.001396	3.3	0.2	515	301	0.44
Below Devil's Cr	4187.74	10-year	2870	3.3	9.3	2.5	7.0	9.4	0.000821	2.7	0.1	1051	415	0.30
Below Devil's Cr	4187.74	100-year	4480	3.3	10.7	2.6	8.1	10.8	0.000567	2.7	0.1	1782	685	0.24
Below Devil's Cr	4050.14	2-year	1700	2.8	7.7	1.5	6.3	7.8	0.001350	2.8	0.1	611	411	0.40
Below Devil's Cr	4050.14	10-year	2870	2.8	9.2	2.7	7.3	9.3	0.000635	2.3	0.1	1252	525	0.24
Below Devil's Cr	4050.14	100-year	4480	2.8	10.6	3.0	7.8	10.7	0.000400	2.2	0.1	2202	728	0.19
Below Devil's Cr	3923.07	2-year	1700	1.7	7.7	2.6	5.1	7.7	0.000208	1.4	0.0	1221	471	0.15
Below Devil's Cr	3923.07	10-year	2870	1.7	9.2	3.4	5.6	9.2	0.000158	1.4	0.0	1995	646	0.14
Below Devil's Cr	3923.07	100-year	4480	1.7	10.6	3.8	6.2	10.7	0.000131	1.5	0.0	3095	806	0.12
Below Devil's Cr	3754.68	2-year	1700	3.7	7.7	2.9	5.0	7.7	0.000080	0.8	0.0	2159	737	0.08
Below Devil's Cr	3754.68	10-year	2870	3.7	9.2	3.6	5.3	9.2	0.000080	0.9	0.0	3314	925	0.08
Below Devil's Cr	3754.68	100-year	4480	3.7	10.6	5.0	5.7	10.6	0.000063	1.0	0.0	4675	944	0.08
Below Devil's Cr	3695.3	2-year	1700	0.6	7.7	2.6	5.2	7.7	0.000160	1.1	0.0	1521	592	0.12
Below Devil's Cr	3695.3	10-year	2870	0.6	9.2	3.7	5.7	9.2	0.000110	1.2	0.0	2441	773	0.11
Below Devil's Cr	3695.3	100-year	4480	0.6	10.6	4.3	6.1	10.6	0.000088	1.3	0.0	3750	859	0.10

PROPOSED CONDITIONS MLLW

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HEC-RAS Plan: PrCd2&3MLLWR River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	3567.52	2-year	1700	2.8	7.6	2.4	5.7	7.7	0.000294	1.5	0.1	1136	474	0.17
Below Devil's Cr	3567.52	10-year	2870	2.8	9.1	3.0	6.1	9.2	0.000173	1.5	0.0	1994	659	0.14
Below Devil's Cr	3567.52	100-year	4480	2.8	10.6	4.2	6.5	10.6	0.000136	1.6	0.0	2991	711	0.13
Below Devil's Cr	3383.39	2-year	1700	2.6	7.5	2.3	5.3	7.6	0.000509	2.3	0.1	733	344	0.27
Below Devil's Cr	3383.39	10-year	2870	2.6	9.0	3.6	5.9	9.1	0.000377	2.3	0.1	1227	534	0.22
Below Devil's Cr	3383.39	100-year	4480	2.6	10.5	3.9	6.5	10.6	0.000255	2.0	0.1	2285	589	0.17
Below Devil's Cr	3162.69	2-year	1700	-0.5	7.4	4.2	3.8	7.5	0.000317	2.2	0.1	767	179	0.19
Below Devil's Cr	3162.69	10-year	2870	-0.5	8.9	2.9	4.9	9.0	0.000340	2.6	0.1	1119	386	0.27
Below Devil's Cr	3162.69	100-year	4480	-0.5	10.4	4.1	5.7	10.5	0.000327	2.6	0.1	1725	418	0.23
Below Devil's Cr	3057.93	2-year	1700	0.6	7.2	4.5	3.9	7.4	0.000873	3.8	0.3	452	98	0.31
Below Devil's Cr	3057.93	10-year	2870	0.6	8.6	2.7	5.1	8.9	0.001064	4.4	0.2	653	237	0.47
Below Devil's Cr	3057.93	100-year	4480	0.6	10.1	3.9	6.4	10.4	0.001013	4.3	0.3	1035	261	0.38
Below Devil's Cr	2853.12	2-year	1700	1.5	7.0	3.7	4.7	7.2	0.001264	4.0	0.3	428	113	0.36
Below Devil's Cr	2853.12	10-year	2870	1.5	8.3	4.6	5.7	8.7	0.001456	4.9	0.4	590	128	0.40
Below Devil's Cr	2853.12	100-year	4480	1.5	9.6	5.3	6.8	10.1	0.001735	5.9	0.6	766	144	0.45
Below Devil's Cr	2680.35	2-year	1700	0.9	6.8	4.1	4.2	7.0	0.001109	4.0	0.3	427	102	0.34
Below Devil's Cr	2680.35	10-year	2870	0.9	8.0	4.9	5.3	8.4	0.001466	5.1	0.5	562	114	0.41
Below Devil's Cr	2680.35	100-year	4480	0.9	9.2	5.5	6.5	9.8	0.001971	6.4	0.7	700	126	0.48
Below Devil's Cr	2555.61	2-year	1700	-0.3	6.4	3.8	4.5	6.8	0.002200	5.3	0.5	319	82	0.48
Below Devil's Cr	2555.61	10-year	2870	-0.3	7.4	4.3	5.7	8.1	0.003192	7.1	0.9	406	94	0.59
Below Devil's Cr	2555.61	100-year	4480	-0.3	7.5	4.3	7.1	9.3	0.006904	10.6	2.0	422	96	0.87
Below Devil's Cr	2432.76	2-year	1700	1.1	6.5	3.7	3.8	6.6	0.000637	2.8	0.2	602	160	0.26
Below Devil's Cr	2432.76	10-year	2870	1.1	7.6	4.5	4.6	7.8	0.000832	3.6	0.2	790	176	0.30
Below Devil's Cr	2432.76	100-year	4480	1.1	8.1	4.7	5.5	8.5	0.001492	5.0	0.4	893	190	0.41
Below Devil's Cr	2314	2-year	1700	1.4	6.4	3.2	3.6	6.5	0.000466	2.2	0.1	783	245	0.21
Below Devil's Cr	2314	10-year	2870	1.4	7.6	4.0	4.3	7.7	0.000517	2.7	0.1	1073	265	0.23
Below Devil's Cr	2314	100-year	4480	1.4	8.1	4.4	5.3	8.3	0.000851	3.7	0.2	1228	277	0.31
Below Devil's Cr	2203.73	2-year	1700	1.5	6.4	3.6	3.5	6.4	0.000472	2.4	0.1	716	197	0.22
Below Devil's Cr	2203.73	10-year	2720	1.5	7.5	4.4	4.1	7.6	0.000525	2.9	0.2	947	218	0.24
Below Devil's Cr	2203.73	100-year	3400	1.5	8.1	4.8	4.5	8.3	0.000557	3.2	0.2	1080	231	0.25
Below Devil's Cr	2099.58	2-year	1700	1.5	5.6	2.6	5.0	6.3	0.005566	6.6	0.9	259	99	0.71
Below Devil's Cr	2099.58	10-year	2720	1.5	6.5	3.0	5.9	7.4	0.006155	7.6	1.2	356	117	0.77

PROPOSED CONDITIONS MLLW

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Geometry: Proposed Conditions MLLW alts 2&3 Rev

HEC-RAS Plan: PrCd2&3MLLWR River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Hydr Radius	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Shear Chan	Flow Area	Top Width	Froude # Chl
Below Devil's Cr	2099.58	100-year	3400	1.5	7.0	3.1	6.4	8.0	0.006441	8.2	1.3	413	133	0.80
Below Devil's Cr	2000	2-year	1700	0.8	4.4	2.2	4.4	5.5	0.011638	8.3	1.6	204	95	1.00
Below Devil's Cr	2000	10-year	2720	0.8	5.3	2.6	5.3	6.6	0.010904	9.2	1.8	297	114	1.00
Below Devil's Cr	2000	100-year	3400	0.8	5.8	2.8	5.8	7.2	0.010570	9.6	1.9	355	125	1.00
Below Devil's Cr	1350	2-year	1700	0.0	0.8	0.8	0.1	0.8	0.000026	0.2	0.0	7599	9999	0.05
Below Devil's Cr	1350	10-year	2720	0.0	0.8	0.8	0.1	0.8	0.000066	0.4	0.0	7599	9999	0.07
Below Devil's Cr	1350	100-year	3400	0.0	0.8	0.8	0.2	0.8	0.000103	0.5	0.0	7599	9999	0.09

PROPOSED CONDITIONS MHHW

Project: Buskin River

Plan: Buskin Proposed MHHW alts 2&3 Revised

Geometry: Proposed Conditions MHHW alts 2&3 Revised

HEC-RAS Plan: PrCd2&3MHHWR River: Buskin Reach: Below Devil's Cr

Steady Flow: Buskin MHHW

Run as subcritical, MHHW boundary condition

HEC-RAS 3.1.3 run 1-26-09

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	9512.09	2-year	1700	20.2	25.0	3.8	23.5	25.5	0.007889	6.1	2.0	283	73	0.53
Below Devil's Cr	9512.09	10-year	2870	20.2	26.4	4.8	24.7	27.3	0.007991	7.5	2.7	395	81	0.56
Below Devil's Cr	9512.09	100-year	4480	20.2	28.2	5.8	26.0	29.3	0.007682	8.8	3.4	542	137	0.58
Below Devil's Cr	9394.8	2-year	1700	18.8	24.4	3.0		24.9	0.003597	5.5	0.9	325	107	0.47
Below Devil's Cr	9394.8	10-year	2870	18.8	26.2	2.4		26.6	0.002644	5.9	1.0	711	291	0.43
Below Devil's Cr	9394.8	100-year	4480	18.8	28.3	3.9		28.7	0.001676	5.8	0.8	1414	357	0.36
Below Devil's Cr	9174.42	2-year	1700	17.6	23.8	4.5		24.2	0.002635	4.8	0.8	355	74	0.38
Below Devil's Cr	9174.42	10-year	2870	17.6	25.6	2.9		26.1	0.002640	5.9	1.1	580	194	0.40
Below Devil's Cr	9174.42	100-year	4480	17.6	27.8	4.0		28.3	0.002007	6.2	1.1	1090	269	0.37
Below Devil's Cr	8922.61	2-year	1700	18.9	22.9	3.4		23.3	0.004342	5.1	1.0	336	95	0.47
Below Devil's Cr	8922.61	10-year	2870	18.9	24.9	4.9		25.4	0.002952	5.6	1.0	528	104	0.42
Below Devil's Cr	8922.61	100-year	4480	18.9	27.2	6.7		27.8	0.002204	6.1	1.1	780	112	0.38
Below Devil's Cr	8803.77	2-year	1700	17.0	22.2	4.0		22.7	0.006663	5.5	1.7	309	75	0.47
Below Devil's Cr	8803.77	10-year	2870	17.0	24.3	5.4		24.9	0.005107	6.3	2.0	471	84	0.44
Below Devil's Cr	8803.77	100-year	4480	17.0	26.7	6.9		27.4	0.004227	7.1	2.2	682	94	0.42
Below Devil's Cr	8704.17	2-year	1700	14.0	21.2	4.6		22.0	0.006849	7.0	2.0	244	47	0.54
Below Devil's Cr	8704.17	10-year	2870	14.0	23.1	5.7		24.2	0.007265	8.7	2.9	334	52	0.58
Below Devil's Cr	8704.17	100-year	4480	14.0	25.0	6.7		26.8	0.007682	10.6	3.9	442	58	0.62
Below Devil's Cr	8585.14	2-year	1700	12.9	21.5	4.9		21.6	0.000718	3.2	0.2	542	106	0.24
Below Devil's Cr	8585.14	10-year	2870	12.9	23.5	6.4		23.7	0.000800	3.9	0.4	765	114	0.25
Below Devil's Cr	8585.14	100-year	4480	12.9	25.8	8.0		26.1	0.000856	4.6	0.5	1036	124	0.26
Below Devil's Cr	8470.78	2-year	1700	13.7	21.0	4.7		21.4	0.006088	5.4	2.0	319	65	0.41
Below Devil's Cr	8470.78	10-year	2870	13.7	22.8	5.9		23.5	0.006572	6.8	2.9	442	71	0.44
Below Devil's Cr	8470.78	100-year	4480	13.7	24.8	7.1		25.8	0.006866	8.2	3.8	593	78	0.47
Below Devil's Cr	8357.96	2-year	1700	13.7	19.8	4.4		20.5	0.009431	6.9	2.7	247	53	0.55
Below Devil's Cr	8357.96	10-year	2870	13.7	21.2	5.3		22.5	0.011298	9.0	4.2	325	56	0.63
Below Devil's Cr	8357.96	100-year	4480	13.7	22.7	6.3		24.7	0.013435	11.3	6.1	411	60	0.72
Below Devil's Cr	8109.32	2-year	1700	12.9	18.6	4.3		19.0	0.003866	5.0	1.1	339	77	0.41
Below Devil's Cr	8109.32	10-year	2870	12.9	19.8	5.1		20.5	0.005111	6.7	1.8	433	82	0.50
Below Devil's Cr	8109.32	100-year	4480	12.9	21.1	6.1		22.2	0.006159	8.5	2.6	545	85	0.56
Below Devil's Cr	7912.72	2-year	1700	13.6	18.1	3.4		18.4	0.002592	4.5	0.6	384	111	0.41

PROPOSED CONDITIONS MHHW

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HEC-RAS Plan: PrCd2&3MHHWR River: Buskin Reach: Below Devil's Cr

Steady Flow: Buskin MHHW

Run as subcritical, MHHW boundary condition

HEC-RAS 3.1.3 run 1-26-09

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	7912.72	10-year	2870	13.6	19.1	4.3		19.7	0.003144	5.9	0.9	507	117	0.47
Below Devil's Cr	7912.72	100-year	4480	13.6	20.5	5.2		21.3	0.003284	7.1	1.3	673	127	0.50
Below Devil's Cr	7815.58	2-year	1700	14.1	17.8	2.6		18.1	0.003672	4.2	0.6	401	155	0.46
Below Devil's Cr	7815.58	10-year	2870	14.1	18.9	3.6		19.3	0.003053	4.9	0.7	583	158	0.45
Below Devil's Cr	7815.58	100-year	4480	14.1	20.4	5.0		20.9	0.002401	5.5	0.8	825	163	0.42
Below Devil's Cr	7803.23	2-year	1700	13.7	17.7	2.1	16.6	18.0	0.004906	4.2	0.6	403	151	0.45
Below Devil's Cr	7803.23	10-year	2870	13.7	18.9	2.7	17.3	19.3	0.004789	5.0	0.8	579	154	0.45
Below Devil's Cr	7803.23	100-year	4480	13.7	20.4	3.2	18.1	20.9	0.004472	5.6	0.9	814	164	0.43
Below Devil's Cr	7778.53	2-year	1700	13.7	17.6	2.0	16.6	17.9	0.006050	4.5	0.7	376	150	0.50
Below Devil's Cr	7778.53	10-year	2870	13.7	18.7	2.6	17.3	19.1	0.005464	5.2	0.9	553	153	0.48
Below Devil's Cr	7778.53	100-year	4480	13.7	20.2	3.2	18.1	20.8	0.004847	5.8	1.0	790	162	0.44
Below Devil's Cr	7758.41	2-year	1700	13.2	17.4	2.5		17.7	0.016170	4.3	2.5	393	159	0.48
Below Devil's Cr	7758.41	10-year	2870	13.2	18.6	3.6		19.0	0.012206	4.9	2.8	587	162	0.45
Below Devil's Cr	7758.41	100-year	4480	13.2	20.2	4.6		20.6	0.009042	5.3	2.9	855	181	0.41
Below Devil's Cr	7580.16	2-year	1700	11.6	16.2	2.5		16.5	0.003546	4.7	0.6	363	140	0.51
Below Devil's Cr	7580.16	10-year	2870	11.6	17.7	3.4		18.1	0.002714	4.6	0.6	630	179	0.42
Below Devil's Cr	7580.16	100-year	4480	11.6	19.5	4.8		19.9	0.002216	4.9	0.8	963	196	0.37
Below Devil's Cr	7352.89	2-year	1700	9.5	15.4	2.9		15.8	0.002756	5.6	0.9	418	138	0.45
Below Devil's Cr	7352.89	10-year	2870	9.5	17.0	4.4		17.5	0.002386	6.3	1.0	644	143	0.43
Below Devil's Cr	7352.89	100-year	4480	9.5	18.8	5.5		19.4	0.002226	7.2	1.2	909	158	0.44
Below Devil's Cr	7212.54	2-year	1700	9.9	15.3	3.9		15.4	0.001817	3.1	0.5	552	137	0.27
Below Devil's Cr	7212.54	10-year	2870	9.9	16.9	5.3		17.1	0.001761	3.8	0.6	781	142	0.28
Below Devil's Cr	7212.54	100-year	4480	9.9	18.7	6.3		19.0	0.001781	4.6	0.8	1046	160	0.29
Below Devil's Cr	7125.28	2-year	1700	9.1	15.0	3.4		15.2	0.004964	3.6	1.3	495	140	0.30
Below Devil's Cr	7125.28	10-year	2870	9.1	16.6	4.3		16.9	0.004450	4.2	1.6	756	171	0.30
Below Devil's Cr	7125.28	100-year	4480	9.1	18.5	4.4		18.8	0.003975	4.7	1.9	1150	256	0.30
Below Devil's Cr	7041.79	2-year	1700	7.6	14.5	3.4		14.8	0.003390	4.4	0.9	421	121	0.37
Below Devil's Cr	7041.79	10-year	2870	7.6	16.1	4.6		16.6	0.003267	5.3	1.2	625	132	0.38
Below Devil's Cr	7041.79	100-year	4480	7.6	17.9	3.6		18.5	0.003316	6.3	1.6	880	235	0.40
Below Devil's Cr	6924.16	2-year	1700	7.4	14.3	4.6		14.5	0.001947	3.8	0.6	448	95	0.30
Below Devil's Cr	6924.16	10-year	2870	7.4	15.9	5.8		16.2	0.002173	4.9	0.9	602	99	0.34

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Steady Flow: Buskin MHHW

Run as subcritical, MHHW boundary condition

HEC-RAS 3.1.3 run 1-26-09

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	6924.16	100-year	4480	7.4	17.6	6.9		18.1	0.002447	6.0	1.2	774	106	0.37
Below Devil's Cr	6703.48	2-year	1700	8.0	13.4	3.7		13.9	0.003636	5.7	0.9	305	82	0.49
Below Devil's Cr	6703.48	10-year	2870	8.0	14.8	4.2		15.6	0.003909	7.1	1.3	425	98	0.54
Below Devil's Cr	6703.48	100-year	4480	8.0	16.3	3.6		17.4	0.004044	8.5	1.7	653	178	0.57
Below Devil's Cr	6511.82	2-year	1700	7.8	12.9	4.0		13.3	0.002455	4.8	0.7	354	85	0.41
Below Devil's Cr	6511.82	10-year	2870	7.8	14.3	5.1		14.9	0.002842	6.2	1.0	471	88	0.46
Below Devil's Cr	6511.82	100-year	4480	7.8	15.8	2.9		16.6	0.003075	7.5	1.3	726	245	0.50
Below Devil's Cr	6358.15	2-year	1700	7.5	12.6	4.2	10.3	12.9	0.002423	4.2	0.7	412	96	0.35
Below Devil's Cr	6358.15	10-year	2870	7.5	13.9	4.4	11.3	14.4	0.002920	5.4	1.0	554	148	0.40
Below Devil's Cr	6358.15	100-year	4480	7.5	15.5	3.4	12.4	16.1	0.003083	6.5	1.4	864	284	0.42
Below Devil's Cr	6254.87	2-year	1700	7.0	12.2	3.1	10.5	12.5	0.008349	4.5	1.7	379	117	0.43
Below Devil's Cr	6254.87	10-year	2870	7.0	13.5	4.1	11.5	13.9	0.007845	5.5	2.2	539	186	0.44
Below Devil's Cr	6254.87	100-year	4480	7.0	15.1	3.4	12.5	15.6	0.006103	5.9	2.3	958	368	0.41
Below Devil's Cr	6079.51	2-year	1700	7.0	11.9	3.1		12.0	0.001012	2.2	0.2	791	252	0.21
Below Devil's Cr	6079.51	10-year	2870	7.0	13.4	4.3		13.5	0.000939	2.6	0.3	1165	270	0.21
Below Devil's Cr	6079.51	100-year	4480	7.0	15.1	5.8		15.2	0.000843	2.9	0.3	1632	276	0.20
Below Devil's Cr	5858.48	2-year	1700	7.0	11.6	2.9	9.4	11.7	0.002456	1.7	0.5	994	338	0.18
Below Devil's Cr	5858.48	10-year	2870	7.0	13.1	4.3	10.0	13.2	0.001789	1.9	0.5	1501	343	0.16
Below Devil's Cr	5858.48	100-year	4480	7.0	14.9	5.9	10.4	14.9	0.001419	2.1	0.6	2113	350	0.15
Below Devil's Cr	5768	2-year	1700	5.2	11.6	4.6		11.6	0.000173	1.3	0.1	1332	284	0.10
Below Devil's Cr	5768	10-year	2870	5.2	13.1	6.0		13.1	0.000207	1.7	0.1	1757	288	0.12
Below Devil's Cr	5768	100-year	4480	5.2	14.8	7.6		14.9	0.000226	2.0	0.1	2268	292	0.13
Below Devil's Cr	5681.59	2-year	1700	5.2	11.5	4.3		11.6	0.001362	2.4	0.4	720	161	0.20
Below Devil's Cr	5681.59	10-year	2870	5.2	12.9	5.5		13.1	0.001561	3.0	0.6	955	168	0.22
Below Devil's Cr	5681.59	100-year	4480	5.2	14.6	6.7		14.8	0.001639	3.7	0.8	1253	181	0.23
Below Devil's Cr	5471.28	2-year	1700	4.6	11.1	4.8		11.3	0.001016	3.8	0.4	500	102	0.28
Below Devil's Cr	5471.28	10-year	2870	4.6	12.3	5.5		12.7	0.001518	5.3	0.7	628	112	0.35
Below Devil's Cr	5471.28	100-year	4480	4.6	13.8	6.4		14.4	0.001929	6.7	1.0	796	122	0.41
Below Devil's Cr	5324.83	2-year	1700	2.1	11.1	3.3		11.2	0.000425	2.3	0.1	952	288	0.18
Below Devil's Cr	5324.83	10-year	2870	2.1	12.4	3.8		12.5	0.000524	3.0	0.2	1363	349	0.20
Below Devil's Cr	5324.83	100-year	4480	2.1	14.0	4.8		14.1	0.000528	3.5	0.3	1980	406	0.21

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Steady Flow: Buskin MHHW

Run as subcritical, MHHW boundary condition

HEC-RAS 3.1.3 run 1-26-09

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Hydr Radius (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Shear Chan (lb/sq ft)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Below Devil's Cr	5234.21	2-year	1700	4.3	11.1	3.3		11.1	0.000389	2.2	0.1	1082	325	0.17
Below Devil's Cr	5234.21	10-year	2870	4.3	12.4	3.9		12.5	0.000486	2.9	0.2	1536	397	0.20
Below Devil's Cr	5234.21	100-year	4480	4.3	13.9	4.7		14.1	0.000502	3.4	0.3	2231	470	0.21
Below Devil's Cr	5003.97	2-year	1700	2.8	10.9	4.4		11.0	0.002178	2.7	0.7	634	143	0.22
Below Devil's Cr	5003.97	10-year	2870	2.8	12.0	5.0		12.2	0.002995	3.7	1.1	809	158	0.26
Below Devil's Cr	5003.97	100-year	4480	2.8	13.5	5.7		13.8	0.003392	4.6	1.6	1065	185	0.29
Below Devil's Cr	4779.81	2-year	1700	4.7	10.3	3.5		10.4	0.003067	2.5	0.7	687	192	0.23
Below Devil's Cr	4779.81	10-year	2870	4.7	11.3	4.4		11.5	0.003922	3.3	1.1	881	198	0.27
Below Devil's Cr	4779.81	100-year	4480	4.7	12.8	5.7		13.0	0.003746	3.9	1.4	1184	207	0.28
Below Devil's Cr	4655.57	2-year	1700	2.6	10.0	4.1		10.2	0.001074	3.1	0.3	559	133	0.26
Below Devil's Cr	4655.57	10-year	2870	2.6	10.8	4.8		11.1	0.001962	4.4	0.6	665	137	0.34
Below Devil's Cr	4655.57	100-year	4480	2.6	12.2	5.8		12.6	0.002458	5.4	1.0	856	144	0.37
Below Devil's Cr	4495.71	2-year	1700	1.1	9.7	5.4		10.0	0.001248	4.0	0.4	422	75	0.30
Below Devil's Cr	4495.71	10-year	2870	1.1	10.0	5.5		10.6	0.003128	6.5	1.1	441	76	0.48
Below Devil's Cr	4495.71	100-year	4480	1.1	10.3	5.8		11.7	0.006381	9.6	2.3	468	77	0.68
Below Devil's Cr	4415.33	2-year	1700	2.8	9.8	3.7	7.0	9.8	0.000345	1.8	0.1	947	324	0.17
Below Devil's Cr	4415.33	10-year	2870	2.8	10.1	3.8	7.6	10.2	0.000742	2.8	0.2	1040	350	0.24
Below Devil's Cr	4415.33	100-year	4480	2.8	10.7	2.9	8.1	10.9	0.001100	3.7	0.3	1252	518	0.31
Below Devil's Cr	4187.74	2-year	1700	3.3	9.7	2.9	6.2	9.7	0.000186	1.4	0.0	1251	437	0.14
Below Devil's Cr	4187.74	10-year	2870	3.3	10.0	3.0	7.0	10.1	0.000400	2.1	0.1	1392	500	0.20
Below Devil's Cr	4187.74	100-year	4480	3.3	10.6	2.6	8.1	10.7	0.000585	2.7	0.1	1757	684	0.24
Below Devil's Cr	4050.14	2-year	1700	2.8	9.7	3.2	6.3	9.7	0.000135	1.1	0.0	1493	615	0.11
Below Devil's Cr	4050.14	10-year	2870	2.8	10.0	3.0	7.3	10.0	0.000287	1.7	0.1	1725	665	0.16
Below Devil's Cr	4050.14	100-year	4480	2.8	10.6	3.0	7.8	10.7	0.000413	2.2	0.1	2175	723	0.20
Below Devil's Cr	3923.07	2-year	1700	1.7	9.7	3.2	5.1	9.7	0.000037	0.7	0.0	2390	751	0.07
Below Devil's Cr	3923.07	10-year	2870	1.7	10.0	3.4	5.6	10.0	0.000083	1.1	0.0	2614	761	0.10
Below Devil's Cr	3923.07	100-year	4480	1.7	10.6	3.9	6.2	10.6	0.000135	1.5	0.0	3066	795	0.13
Below Devil's Cr	3754.68	2-year	1700	3.7	9.7	4.1	5.0	9.7	0.000018	0.5	0.0	3810	936	0.04
Below Devil's Cr	3754.68	10-year	2870	3.7	10.0	4.4	5.3	10.0	0.000040	0.7	0.0	4087	939	0.06
Below Devil's Cr	3754.68	100-year	4480	3.7	10.6	4.9	5.7	10.6	0.000064	1.0	0.0	4640	943	0.08

PROPOSED CONDITIONS MHHW

Project: Buskin River

Plan: Buskin Proposed MHHW alts 2&3 Revised

Geometry: Proposed Conditions MHHW alts 2&3 Revised

HEC-RAS Plan: PrCd2&3MHHWR River: Buskin Reach: Below Devil's Cr

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Hydr Radius	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Shear Chan	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(lb/sq ft)	(sq ft)	(ft)	
Below Devil's Cr	3695.3	2-year	1700	0.6	9.7	3.6	5.2	9.7	0.000024	0.6	0.0	2987	822	0.05
Below Devil's Cr	3695.3	10-year	2870	0.6	10.0	3.9	5.7	10.0	0.000056	0.9	0.0	3227	832	0.08
Below Devil's Cr	3695.3	100-year	4480	0.6	10.6	4.3	6.1	10.6	0.000090	1.3	0.0	3718	858	0.10
Below Devil's Cr	3567.52	2-year	1700	2.8	9.7	3.5	5.7	9.7	0.000038	0.8	0.0	2374	677	0.07
Below Devil's Cr	3567.52	10-year	2870	2.8	10.0	3.7	6.1	10.0	0.000086	1.2	0.0	2565	686	0.10
Below Devil's Cr	3567.52	100-year	4480	2.8	10.5	4.2	6.5	10.6	0.000139	1.6	0.0	2964	711	0.13
Below Devil's Cr	3383.39	2-year	1700	2.6	9.7	4.1	5.3	9.7	0.000083	1.2	0.0	1449	562	0.10
Below Devil's Cr	3383.39	10-year	2870	2.6	9.9	4.3	5.9	10.0	0.000200	1.9	0.1	1535	567	0.16
Below Devil's Cr	3383.39	100-year	4480	2.6	10.5	3.8	6.5	10.5	0.000262	2.0	0.1	2262	588	0.18
Below Devil's Cr	3162.69	2-year	1700	-0.5	9.6	3.4	3.8	9.7	0.000075	1.2	0.0	1410	410	0.12
Below Devil's Cr	3162.69	10-year	2870	-0.5	9.9	3.6	4.9	9.9	0.000186	1.9	0.0	1500	413	0.18
Below Devil's Cr	3162.69	100-year	4480	-0.5	10.4	4.1	5.7	10.5	0.000335	2.6	0.1	1708	418	0.23
Below Devil's Cr	3057.93	2-year	1700	0.6	9.6	3.4	3.9	9.7	0.000204	1.9	0.0	893	257	0.18
Below Devil's Cr	3057.93	10-year	2870	0.6	9.7	3.6	5.1	9.9	0.000534	3.1	0.1	928	258	0.29
Below Devil's Cr	3057.93	100-year	4480	0.6	10.1	3.9	6.4	10.4	0.001043	4.4	0.3	1023	261	0.39
Below Devil's Cr	2853.12	2-year	1700	1.5	9.5	5.2	4.7	9.6	0.000261	2.3	0.1	753	143	0.17
Below Devil's Cr	2853.12	10-year	2870	1.5	9.5	5.2	5.7	9.7	0.000747	3.8	0.2	752	143	0.29
Below Devil's Cr	2853.12	100-year	4480	1.5	9.6	5.2	6.8	10.1	0.001791	5.9	0.6	757	143	0.45
Below Devil's Cr	2680.35	2-year	1700	0.9	9.5	5.6	4.2	9.6	0.000246	2.3	0.1	738	129	0.17
Below Devil's Cr	2680.35	10-year	2870	0.9	9.4	5.6	5.3	9.6	0.000738	4.0	0.3	724	128	0.29
Below Devil's Cr	2680.35	100-year	4480	0.9	9.1	5.4	6.5	9.8	0.002052	6.5	0.7	689	125	0.49
Below Devil's Cr	2555.61	2-year	1700	-0.3	9.5	6.0	2.6	9.5	0.000005	0.4	0.0	4380	717	0.02
Below Devil's Cr	2555.61	10-year	2870	-0.3	9.5	6.0	3.1	9.5	0.000013	0.6	0.0	4380	717	0.04
Below Devil's Cr	2555.61	100-year	4480	-0.3	9.5	6.0	3.5	9.6	0.000033	0.9	0.0	4380	717	0.06